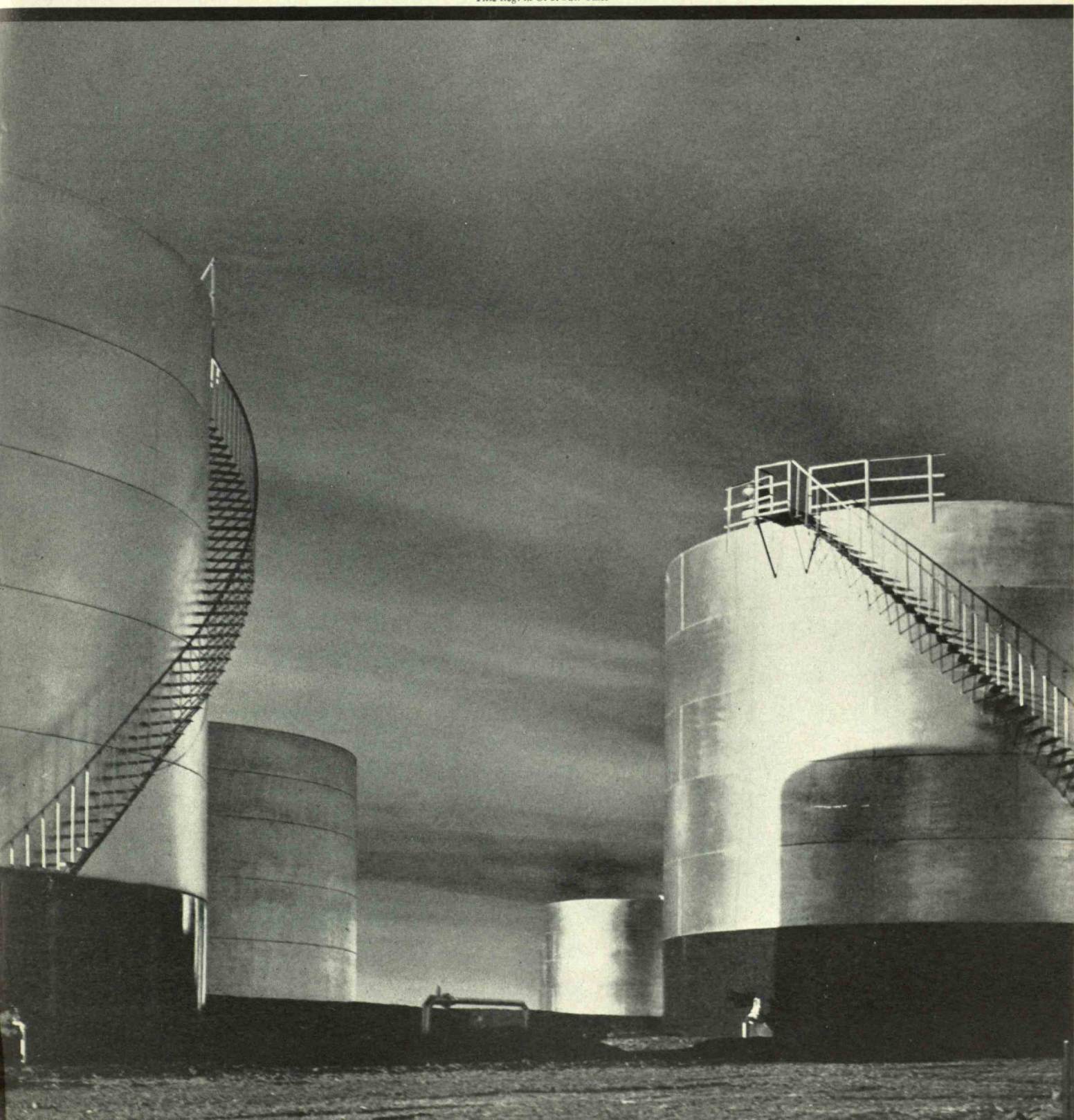
March 1947

TECHNOLOGY REVIEW

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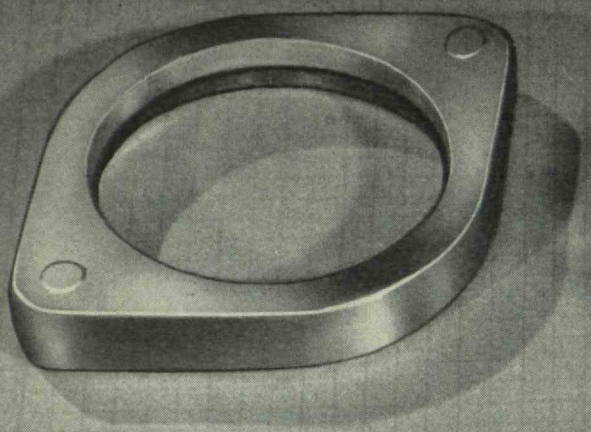


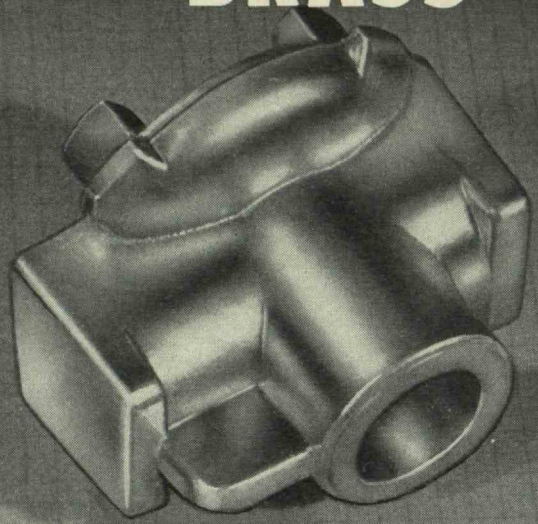
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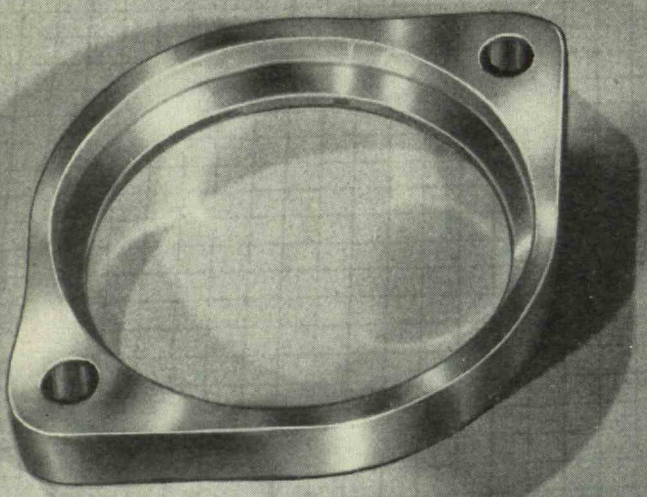
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BRASS

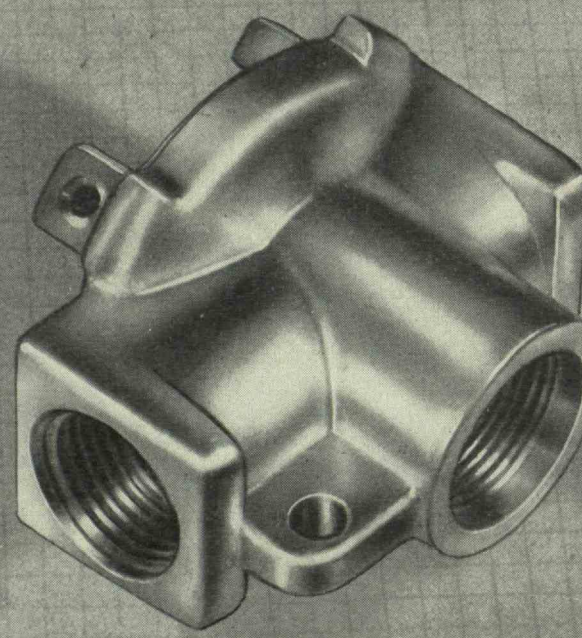




SMOOTH FORGED



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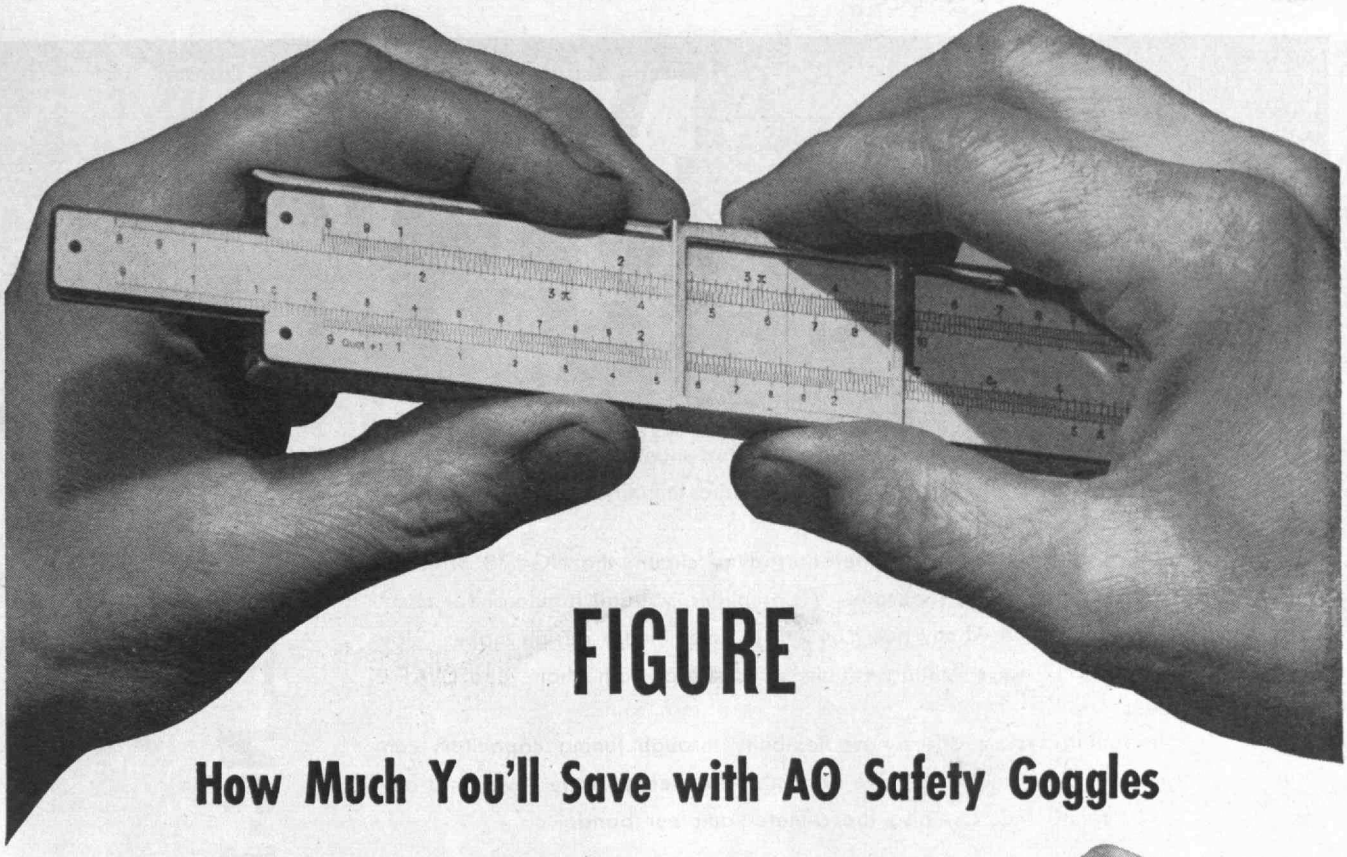


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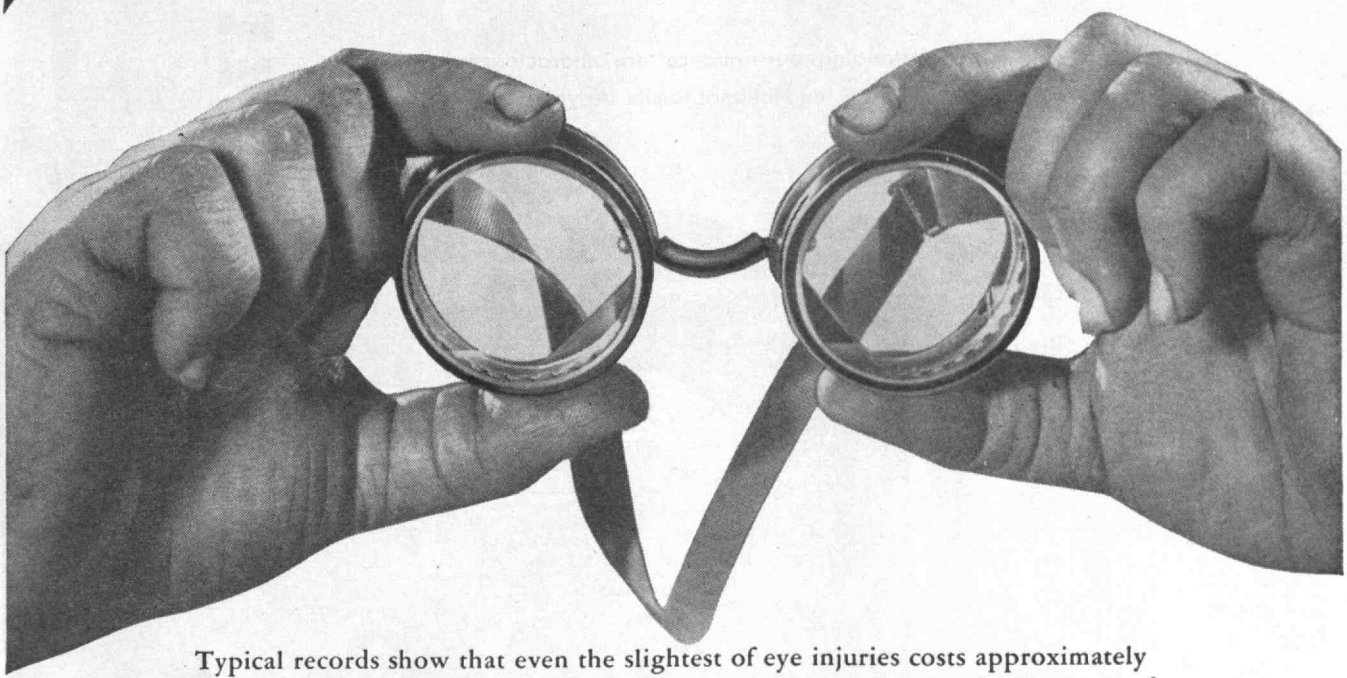
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FIGURE

How Much You'll Save with AO Safety Goggles



Typical records show that even the slightest of eye injuries costs approximately $15.00 (in lost time, idle machine time, medical attention, etc.). Yet, according to the Society for the Prevention of Blindness, *98% of all eye injuries can be prevented by the use of safety goggles.*

AO Safety Goggles are saving sums like these: a manufacturer of electrical equipment —$14,000 in two years; a large machinery maker—$44,000 annually. And in most instances entire eye protection programs pay for themselves in six months to a year.

Why not look at your own eye injury costs, and figure what an adequate eye-protection program would save. As a help in figuring send for a copy of the new booklet "Eye Accident Costs."
Write to Box T.

American Optical COMPANY *Safety Division*

SOUTHBRIDGE, MASSACHUSETTS. OFFICES IN PRINCIPAL CITIES

THE TECHNOLOGY REVIEW, March, 1947. Vol. XLIX, No. 5. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription $3.50; Canadian and Foreign subscription $4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

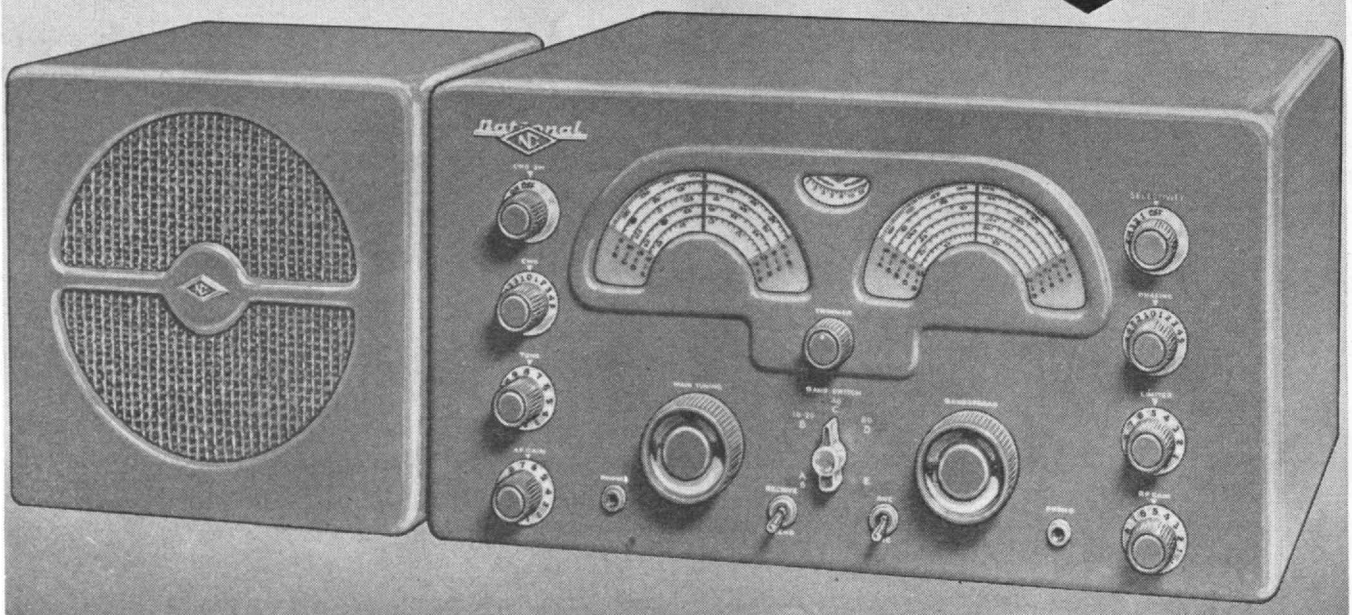
SOON . . . THE NEW NATIONAL NC-173

The NC-173 is the wholly new product of months of post-war research, prompted by war-time advances in radio technique.

Utilizing 13 tubes in a superheterodyne circuit, the NC-173 offers an RF amplifier stage, separate AVC amplifier, voltage regulator for circuit stabilization. A wholly new concept in noise limiter design makes "double-action" noise limiting equally effective for both phone and CW.

Its tuning system offers new flexibility through tuning capacitors connected in parallel on all five bands. Its frequency range covers not only 540 to 30 MC. but also the 6-meter amateur band.

Smart styling and outstanding performance are characteristics you'll note in this newest member of the National family. At your dealer's soon.



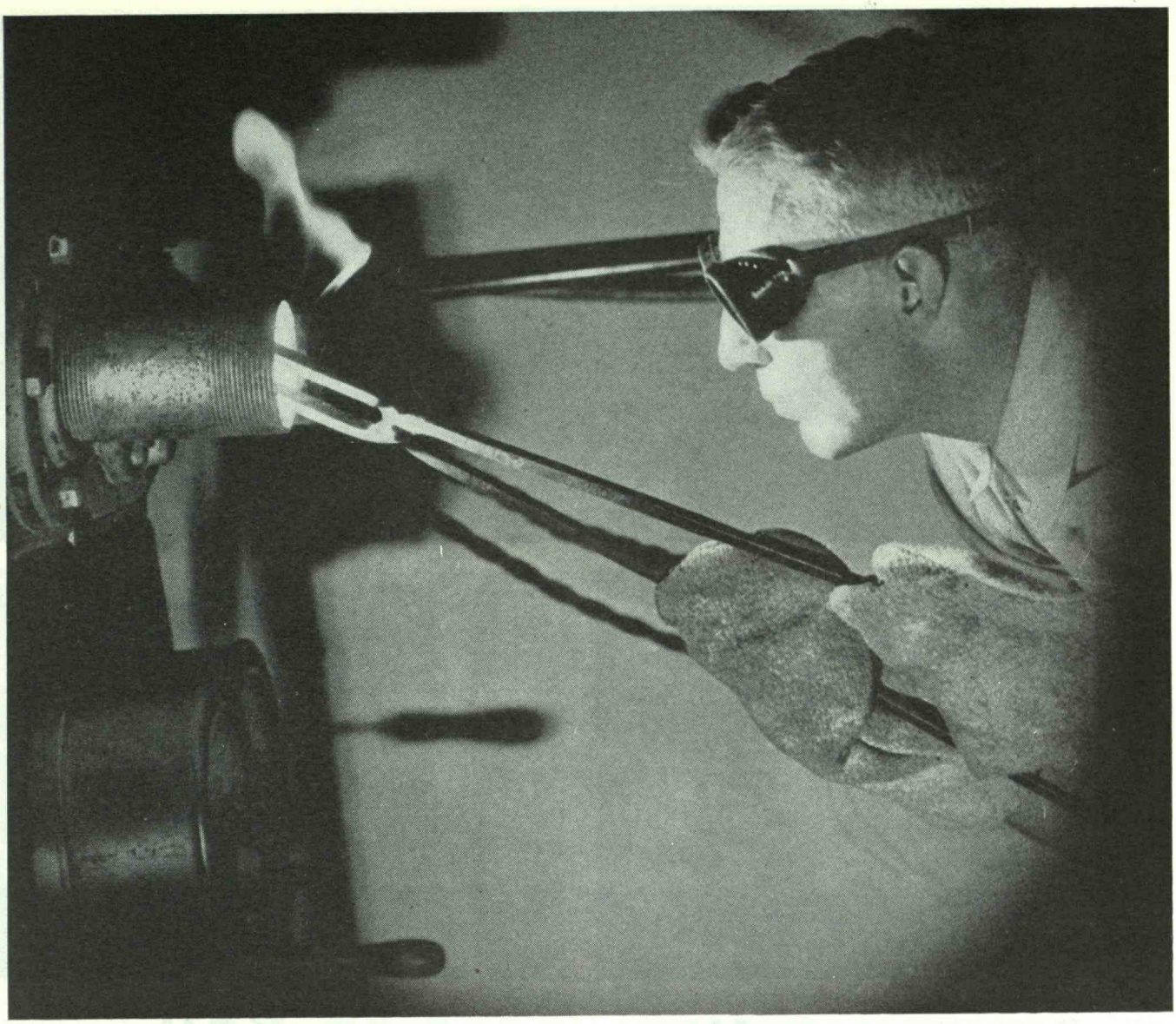
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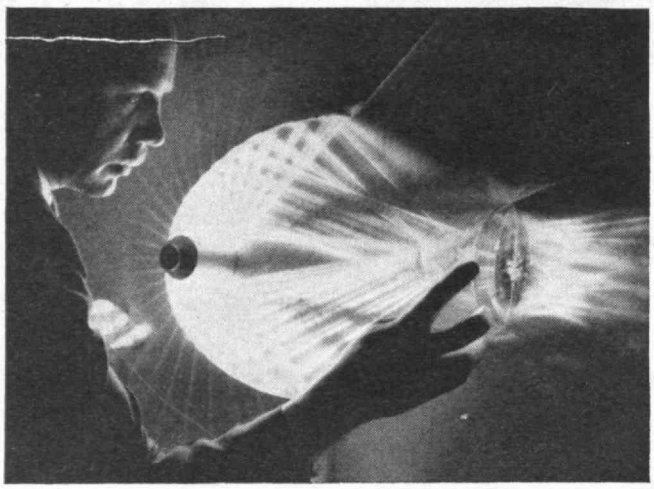


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BRINGING NEW IDEAS TO YOU...

from the Laboratories of General Electric

IN THEIR work in the General Electric Flight Test Laboratory, people like Girl-Engineer Marguerite Hartl, shown above, are bringing nearer the day when you will fly in planes powered with gas turbines. Once used only in fast jet-propelled fighters, G-E gas turbines like the Propjet will soon fly commercial airliners and perhaps your own sports plane . . .

Safer lighting of streets is a never-ending search in the company's Illuminating Engineering Laboratory. Lighting Specialist Hal Breeding studies the light pattern of a reflector on test . . .

The day may not be far off when snowclouds may be forced to drop their snow over ski slopes rather than over your city. Vincent J. Schaefer of the G-E Research Laboratory can change real clouds as well as laboratory ones into snow . . .

These are three of the many hundreds of men and women who work in the 29 G-E laboratories to make new ideas serve you. Some, like Mr. Schaefer, seek fundamental truths for science. Others, like Mr. Breeding, work to ***apply*** these truths in the making of better products. Still others, like Mrs. Hartl, study and test G-E products, the materials that go into them and the machines by which they are made.

With the help of this large and well-equipped laboratory team, General Electric carries further its basic aims . . . to make jobs secure and profitable for its workers, to gain a fair return for its stockholders, and to make new and better products for the public.

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For the rubber industry, Cabot is the world's largest producer of SRF Carbon Black. Yet SRF Black is but one of the forty-one distinct grades of this important raw material produced by the Cabot organization for the rubber, ink, paint, varnish and lacquer industries.

All maintain the same high characteristics. In the manufacture of Carbon Black by the Channel process, for instance, Cabot established the standards by which all other Channel Blacks are judged. Emphasis always is on sustained high quality in all of the diversified Cabot production schedules.

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GENERATOR ROTORS CAN BE OPERATED SAFELY AT 125,000 RPM
Cunico is the newest addition to the Arnold high quality permanent magnet line. It is a copper nickel cobalt alloy which has very high coercive force. Ductile, machineable and malleable, Cunico can be fabricated into a wide variety of simple and complex designs. Drawing, cutting, machining, punching and screw machine operations are practical.
Cunico can be magnetized in any direction, and is most efficient where a large cross section is available to produce sufficient total flux. Generator rotors are a typical application. A relatively short length is required to maintain the flux because of its high coercive force.
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INDUCTION B GAUSS
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CUNICO CAN BE PRODUCED IN THE FOLLOWING SHAPES AND APPROXIMATE SIZES:
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PERMANENT MAGNETS for Industry
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"Permanent Magnets for Industry" suggests many ways in which the war-born improvements in permanent magnets can be most valuable to you. Send for it!



how to braze 18 pieces into 6 units *in 7 Seconds*

Cutting costs by reducing assembly time is a neat trick . . . and here's how you can do it with induction heating.

The normal method of flame brazing this three-piece, steel tube assembly did as well as any other technique then available. But production was pitifully slow. It took minutes to complete one entire unit.

By designing a jig like the one shown above, a simplified, efficient system was found to do the job. The fixture held 6 complete units (18 separate pieces) in place firmly while a standard Westinghouse 20-kw generator brazed all six uniformly in 7 seconds! Final operation was so simple a girl could easily handle the assembly and brazing.

The beauty of electronic heating is its unmatched ability to do all types of heat-treating jobs quickly . . . annealing, hardening, sintering, soldering, curing, bonding and molding. Ask your Westinghouse office today for all the facts on induction heating and where it fits your operations. Or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Penna. J-08143



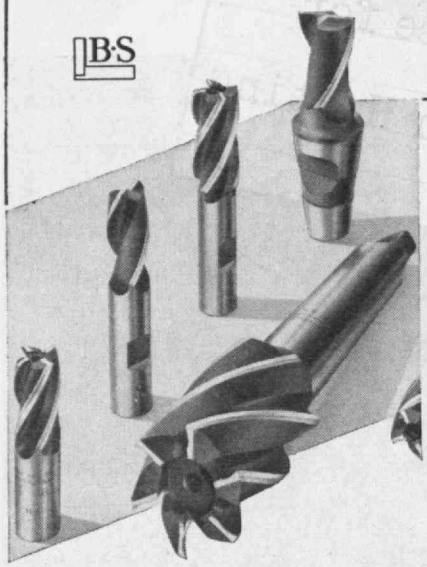
Here's Helpful Information on both induction and dielectric heating . . . their principles and theories; where to use them; how to select them; actual case histories of their use. Write for your copy today. Ask for B-3620.

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Hevi Duty Electric Co.

Surges Transformers

With the acquisition of the Surges Electric Company of Milwaukee, Hevi Duty can now offer quality dry type air cooled transformers with or without tap changing switches as well as special transformers for special requirements. An accelerated program of modernization will present opportunities for increased production and good delivery schedules.

Write for Bulletin S-4611

HAROLD E. KOCH '22, *President*

ELTON E. STAPLES '26, *District Manager, Cleveland*

HEVI DUTY ELECTRIC COMPANY

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THE TABULAR VIEW

Watery Chorus. — Turning from geophysical prospecting to oceanic prospecting during the war, MILTON B. DOBRIN, '36, gives an excellent account (page 271) of noises produced by a large number of species of fish, shrimp, and other aquatic inhabitants. That such research was an important, if somewhat unexpected, necessity during the war may be surmised when it is realized that about the only way a submarine commander gets information from outside his ship's submerged hull is by underwater sound equipment. When a hydrophone picks up strange sounds, it is highly important to know whether they are caused by enemy ships, submarine mines, or lowly fish. Currently on leave of absence from the Naval Ordnance Laboratory to continue his graduate studies at Columbia University, Mr. Dobrin has written a number of articles which have appeared in The Review.

Nocturnal Survey. — Example of peacetime research applied to problems of warfare is given by PROFESSOR HAROLD E. EDGERTON, '27, who recounts for us (page 273) the military applications of electric-flash photography for night aerial reconnaissance. His article portrays an excellent example of the co-operation of sciences to achieve a desired goal; for aeronautical engineering, photographic engineering, and several branches of electrical engineering combined to adapt radar and electric-flash techniques to the problem of ferreting out what the enemy does at night. Dr. Edgerton, whose doctoral thesis on the hunting of synchronous motors led to the development of electric flash and stroboscopic light sources, has long been known as an authority on photographic techniques with microsecond exposures.

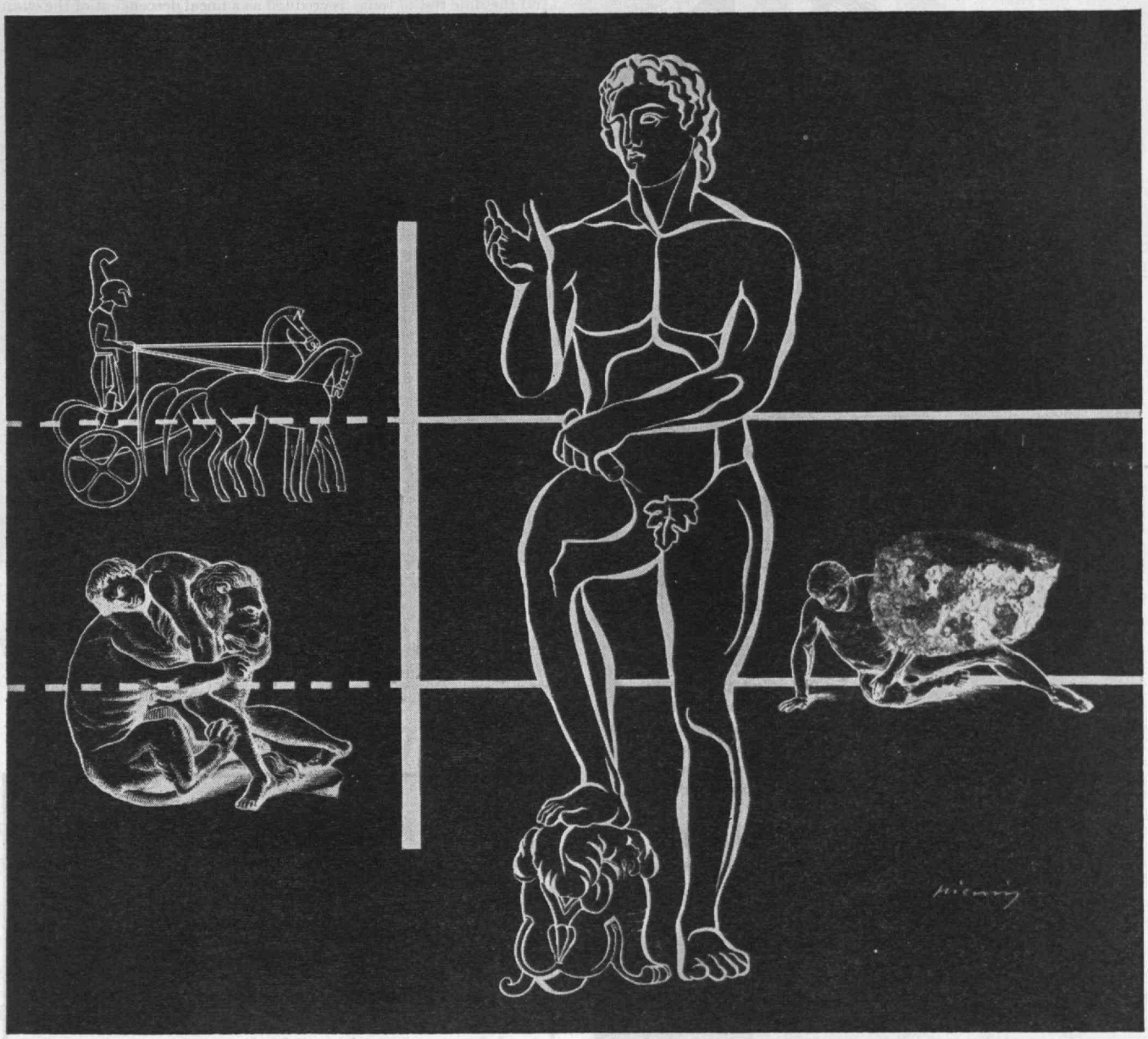
Blessed Sleep. — Frequent contributor to The Review, DR. TENNEY L. DAVIS, '13, turns from the chemistry of explosives to present an able, historical account (page 279) of the discovery of anesthesia, first publicly demonstrated in Boston's Massachusetts General Hospital a bit over a century ago. Included in Dr. Davis' survey are comments on the historical documentation of this famous discovery as recorded in recent publications. Dr. Davis' retirement from the professorship of organic chemistry at M.I.T. in June, 1942, has not curbed his activities. Between 1941 and 1943 he produced three volumes on *The Chemistry of Powder and Explosives* and now directs research for National Fireworks, Inc.

On the Other Foot. — The self-criticism which we directed at ourselves during the war in sometimes providing too little equipment too late, seems to have afflicted the Germans as well as the Allies. At least, this is the case with some of the guided missiles which were in the development stage when the war ended, as confirmed in the article by WILLY LEY (page 281). Distressing as are these grim developments, they serve as reminders of the alternatives of failure of the peace treaties now processing. Mr. Ley is well known to Review readers not only as a writer on topics of science and engineering but as a research worker at the Washington Institute of Technology.

IT TAKES MORE THAN MUSCLE

According to legend, Polydamas, the Greek athlete, killed a lion with his bare hands, stopped a chariot in full flight, and lifted a raging bull off the ground with ease. His career, however, came to a spectacular end when he tried to catch a huge falling rock.

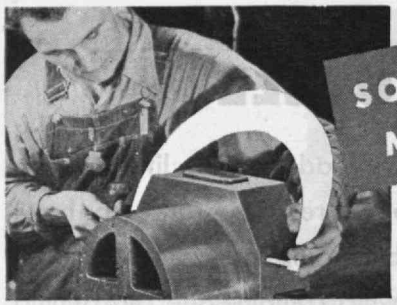
Today, sudden, heavy loads end the life of many steel parts. Low temperatures, for instance, can have a depressing effect on the impact strength of steels. Molybdenum steels, which combine deep hardening and freedom from temper brittleness, reduce this risk.



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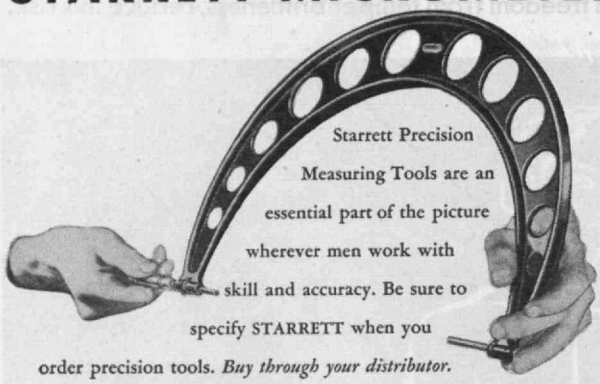
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MOLY



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MAIL RETURNS

Origin of the Lathe

FROM C. J. LEBEL, '26:

I believe that your editorial "Prospect and Retrospect" in the January, 1947, issue got off to a doubtful start by crediting the invention of the lathe to David Wilkinson in 1797.

The lathe was invented centuries before David Wilkinson's time, and the patent which prompted your comment covers the slide rest. However, it would appear that the slide rest much precedes Wilkinson's work, since it was pictured in French encyclopedias of 1717 and 1772. And the slide rest of today is credited as a lineal descendent of the work of Henry Maudslay by the authority J. W. Roe in Chapter I of his classic *English and American Tool Builders* (Yale University Press). *New York 25, N. Y.*

A Problem in Rapid Descent

FROM HOWARD M. EDMUNDS, '05:

A few years ago you ran a feature in which "teasers" were set for solution by your readers. I am therefore emboldened to ask the solution to the brachistochrone problem for a specific set of conditions.

Point A is located on a vertical wall 16 feet high, whereas Point B is in a horizontal direction 32 feet from the foot of the wall. I shall be greatly obliged if you would show how to find the curve of quickest descent of a frictionless bead, sliding by gravity from A to B, and also give the total time of descent. The stumbling block in the brachistochrone problem is the determination of the integration constant.

The bibliographies available from sources at my disposal seem to give no solution for a specific case. I have hunted in four languages (including Latin) for a solution as applied to a specific case, but so far without success.

In connection with the difficulty occasionally encountered in finding a specific solution for a problem whose general solution is known, it is interesting to note that, under the subject of Curves, the *Encyclopedia Britannica* states that although Newton gave the correct answer to the problem set by Bernoulli and Leibnitz in about 1700 A.D., it took the mathematical world until about 1850 to determine that there is only one cycloid which answers for any assigned set of conditions.
New York 28, N. Y.

Although Mr. Edmunds has obtained the solution to his problem since the above communication was written, his letter is presented for the benefit of those Review readers who might like to try their hand at an interesting mathematical pastime. — Ed.

Speed with Economy

We are now working on our 11th contract for
U. S. INDUSTRIAL CHEMICALS, INC.

whom we have had the pleasure of serving since 1935

W. J. BARNEY CORPORATION
101 PARK AVENUE, NEW YORK
INDUSTRIAL CONSTRUCTION
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"Wisdom must be intuitive reason combined with scientific knowledge"
—ARISTOTLE (DIALOGUES)



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THE TEMPTING FOODS spread before the family of today are more nourishing and purer than ever before.

All the way from farm to table, *modern means of food preservation* protect foods against damaging molds, bacteria, insects—against loss of nutrients.



Chemical refrigerants preserve meat . . . nitrogen gas safeguards the purity of canned foods . . . ethylene oxide and "dry ice" protect wheat before it is milled . . . stainless steel tanks prevent contamination of foods and beverages . . . and plastics line many food containers.

Food preservation has become an industrial science —and well illustrates the fact that when man has better materials he can do better things.

Producing better materials for the use of industry and the benefit of mankind is the work of UNION CARBIDE.

Basic knowledge and persistent research are required, particularly in the fields of science and engineering. Working with extremes of heat and cold, and with vacuums and great pressures, Units of UCC now separate or combine nearly one-half of the many elements of the earth.

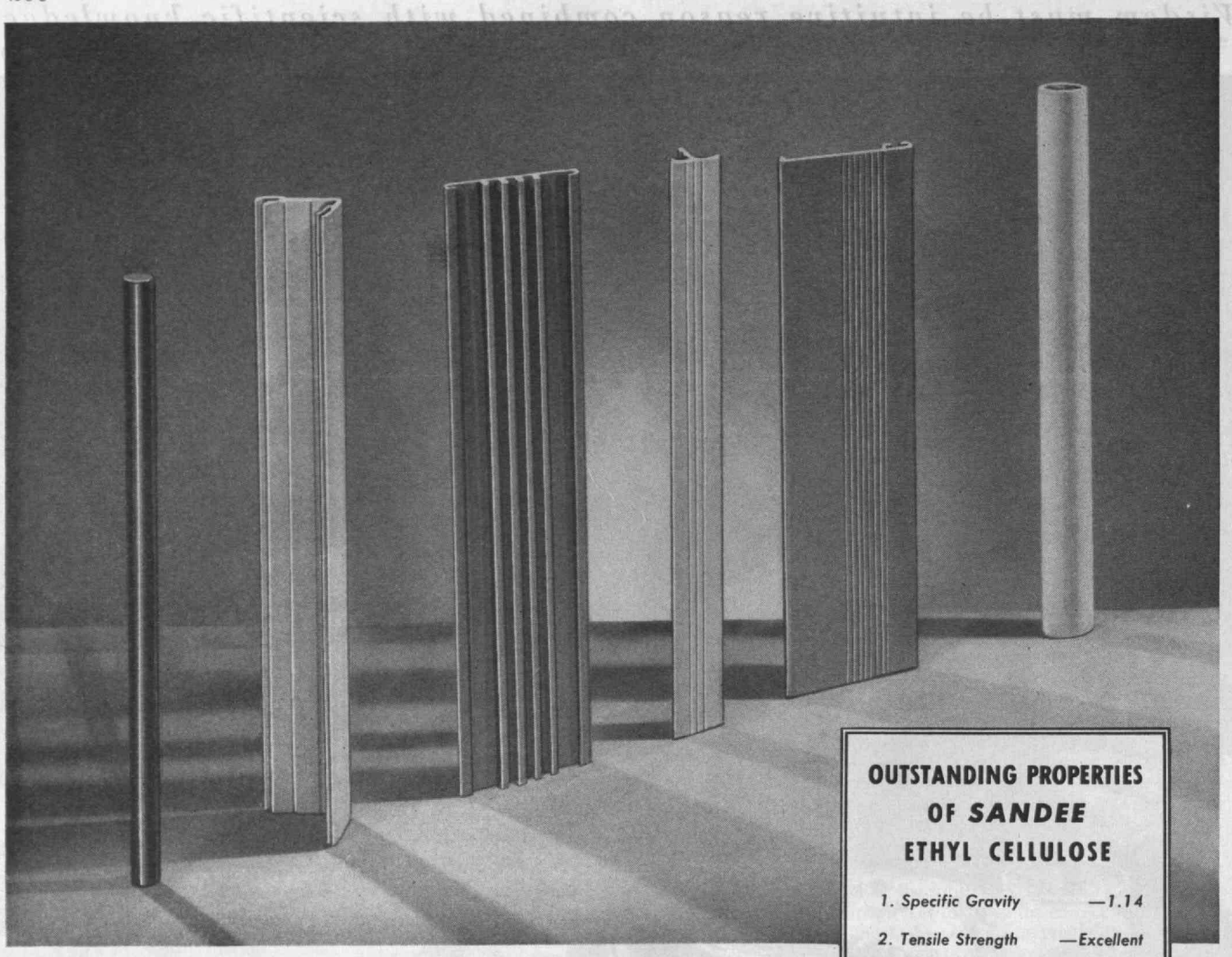
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1. *Specific Gravity* —*1.14*
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3. *Impact (high & low temps)* —*Excellent*
4. *Heat distortion* —*170—185°*
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6. *Dimensional Stability* —*Very Good to Excellent*
7. *Burning Rate* —*Slow*
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Sandee ETHYL CELLULOSE *Extrusions*

THE excellent dimensional stability and low temperature impact strength of Ethyl Cellulose successfully filled many rigid war-time requirements in injection molded parts. However, to meet peacetime requirements, higher rigidity and greatly improved finish had to be added to the above properties. Sandee, with the full cooperation of material suppliers, can now offer either high gloss or semi-gloss finish extrusions of excellent rigidity and dimensional stability. Rods, tubes, simple and complicated shapes in this excellent modern material can be extruded to meet your exacting requirements. If an extruded plastic can serve, by all means take advantage of our newly enlarged facilities and all the skill and experience of our plastic engineers.

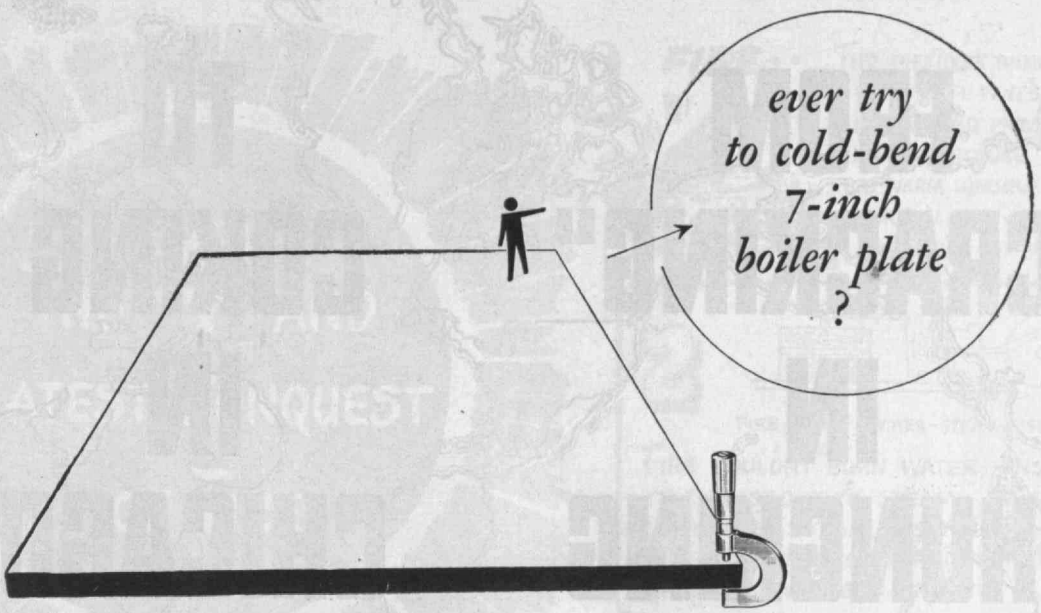
ELMER SZANTAY, General Manager, '35

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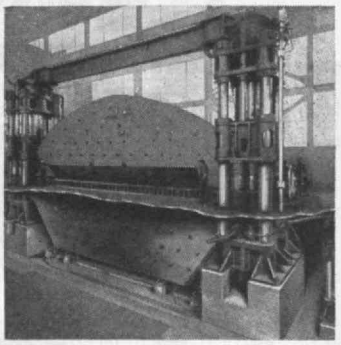
— to interpret, from a world-wide background in every important industry, the specific needs of each installation.

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— to manufacture complete steam generating units for every requirement, from 30 boiler horse power up to the largest.

It requires a pressure of about 6000 tons. We can do it with the largest boiler plate bending press in America.

This giant press is 55 feet wide and 49 feet high (27 feet above ground and 22 below). The tremendous pressure exerted by it is needed in the final stages of forming heavy plate, where cold-bending eliminates warping and permits finishing to very close tolerances.



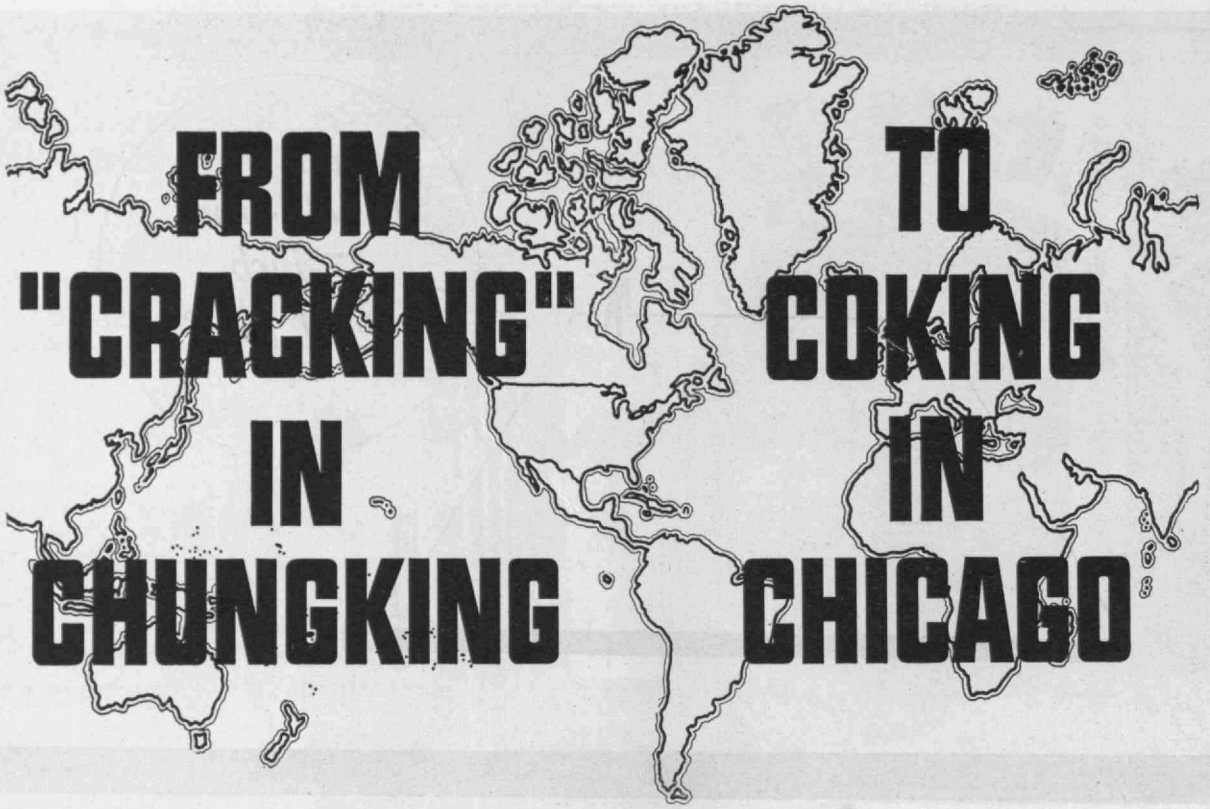
So far we haven't had to cold-bend 7-inch boiler plate, present commercial limits being slightly over 5 inches, but to be *able* to do so is a not-unusual example of C-E facilities. In the 60 acres of C-E plants you will find specialized equipment for every manufacturing requirement — some of it as spectacular as this 6000-ton press.

This has importance for you. It means that the exact needs of your installation can be met without compromise — that C-E knowledge and experience is backed by complete manufacturing facilities for every required type and capacity of steam generating unit above 30 boiler horse power.

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THE MARCH OF SCIENCE

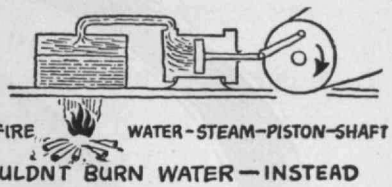
THE 4th AND LATEST CONQUEST OF FIRE



1 FIRE·· THE DIFFICULT THING ABOUT FIRE IS THAT IT'S HOT! IT BURNS! BUT PRIMITIVE MAN LEARNED TO USE THIS HEAT TO WARM HIMSELF···COOK··· HARDEN CLAY··· SOFTEN AND MELT METAL.

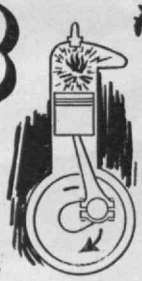


2



FIRE COULDN'T BURN WATER—INSTEAD IT CHANGED IT TO STEAM. SO MAN HARNESSED STEAM, USING FIRE INDIRECTLY TO PUSH A PISTON—TURN A WHEEL AND SHAFT....

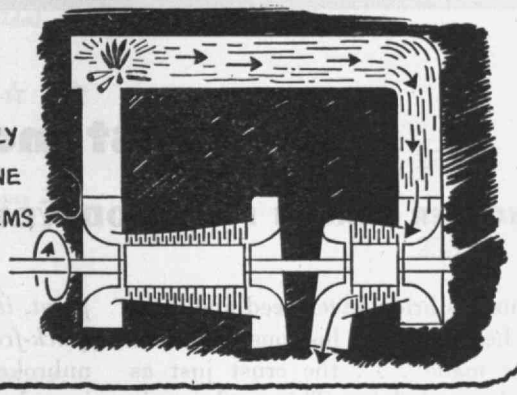
3



FIRE-PISTON-SHAFT·· INVENTION OF THE INTERNAL COMBUSTION ENGINE ELIMINATED STEAM AS A LINK···BROUGHT FIRE CLOSER TO THE CRANK··· BUT THE FRICTION OF RECIPROCATING MACHINERY STILL LOSES POWER···CAUSES WEAR.

4 THE GAS TURBINE··

NOW, IN THE GAS TURBINE, FIRE IS APPLIED DIRECT TO THE SHAFT. A COMPRESSOR SUPPLIES AIR TO THE COMBUSTION CHAMBER. FUEL BURNER HEATS AIR, GREATLY INCREASING ITS VOLUME. HEATED AIR RUSHES THROUGH TURBINE AND TURNS SHAFT. SOUNDS SIMPLE BUT MANY TOUGH PROBLEMS OF DESIGN AND METALLURGY HAD TO BE SOLVED TO MAKE IT PRACTICAL.....



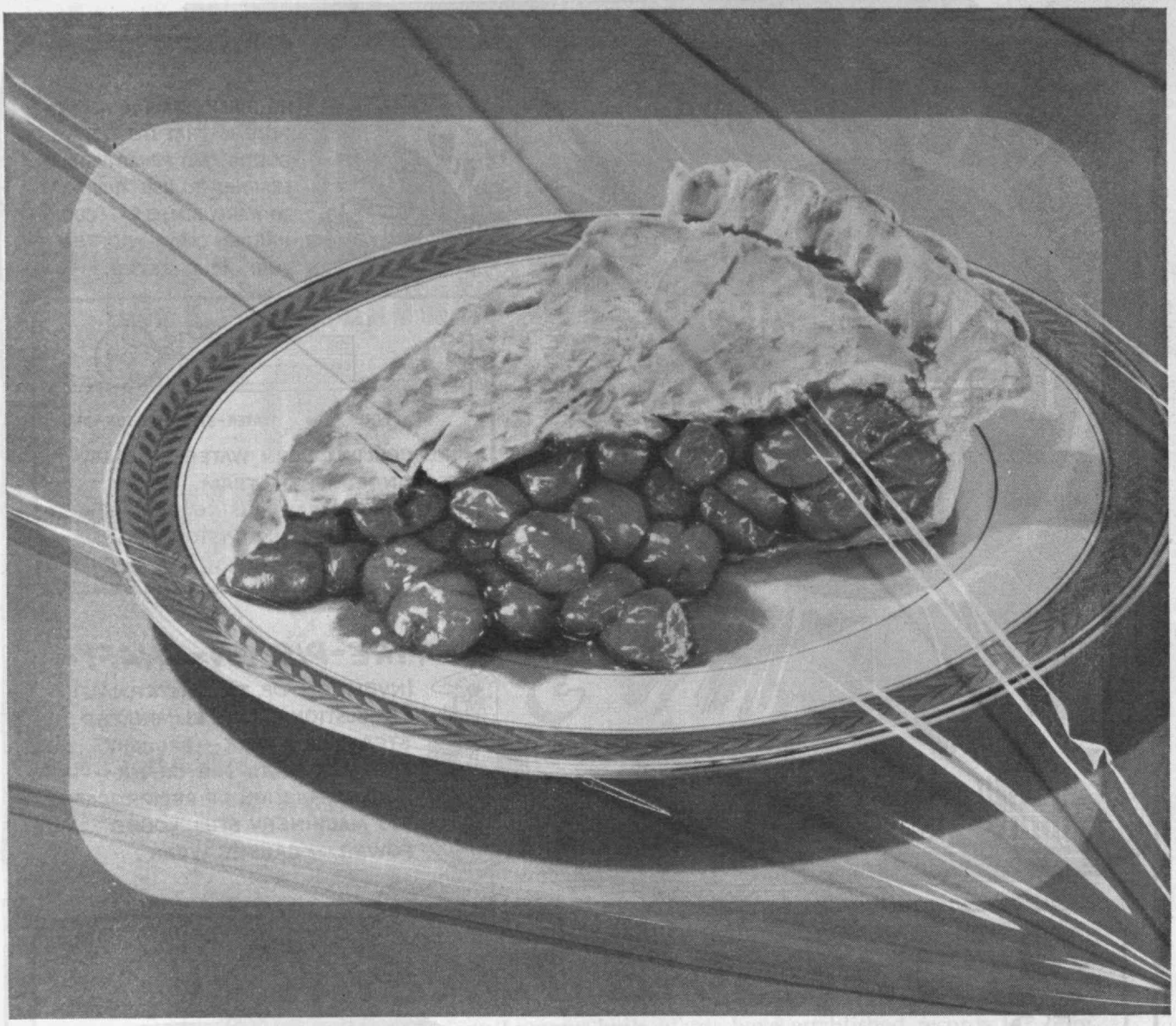


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Photo by H. Armstrong Roberts

"Science; Hmmpf!"

THE TECHNOLOGY REVIEW

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From a photograph by Partridge from Black Star

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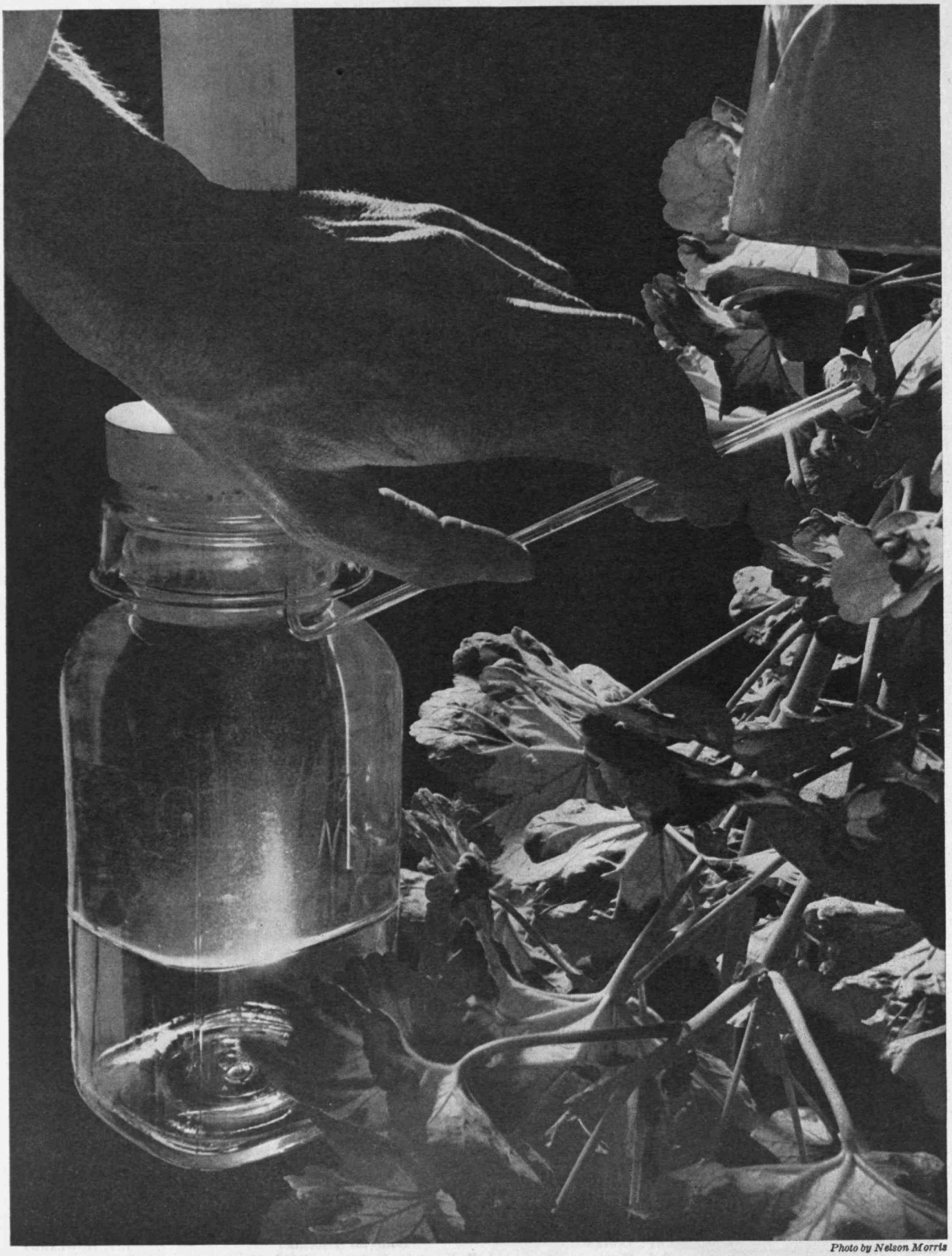


Photo by Nelson Morris

Hydroponics — soilless growing of plants

THE
TECHNOLOGY
REVIEW

Vol. 49, No. 5

March, 1947

The Trend of Affairs

"Get It!"

MARCH 3 marks the centenary of the birth, in Edinburgh, Scotland, of Alexander Graham Bell, whose invention of the telephone opened a new era in private communication. Under the stimulating influence of his father, Alexander Melville Bell, a well-known teacher of speech and phonetics, young Bell had been interested from early youth in phonetics, speech, and acoustics, and began his career as a teacher of deaf mutes. The Bell family moved to Tutelo Heights near Brantford, Ontario, Canada, in 1870 but another migration was soon in store for young "Aleck." Upon invitation of the Board of Education of Boston to make experiments in the city school for deaf mutes, Bell first arrived in Boston on April 1, 1871, and took up permanent residence in Boston and its environs on October 1, 1872. Two years later, on October 27, 1874, while residing in Salem with the grandparents of one of his pupils, Bell declared his intention to become a United States citizen.

Although the musical sounds produced by electric telegraphs interested him greatly, Bell's early experiments were directed to means for improving the telegraph rather than toward devising an electrical method of reproducing speech. In this country, Bell's vibrating reed telegraph has now developed into the vast Bell Telephone System, and telephonic communication with persons in all parts of the civilized world is possible. With assets of more than $6,500,000,000 in 1944, the Bell System is the second largest corporation in America.

Proponents of the theory that technology increases unemployment may be reminded that in 1945 some 459,000 persons were employed to maintain 110,700,000 miles of wire lines and to operate the 27,867,000 telephones in the United States where 54 per cent of the world's telephones are installed. During 1945, the last year for which accurate figures are available, 36,800,000,000 telephone calls were made at the rate of 284.4 conversations per capita per year.

From the vantage point of a century later, it is not easy to recognize the difficulties which stood in the way of electrical transmission of speech in 1847, or even 25 or 30 years later, when Bell's work was first crowned with success. But the history of the telephone, and particularly its very early history, is of all-embracing interest to Review readers, not alone because the telephone was developed in Boston, but also because Bell had friends among the Faculty and carried out early researches in acoustics at the laboratories of the Massachusetts Institute of Technology, which was just rounding out its first decade of educational service.

At a time when his invention was not quite yet an instrument for satisfactorily conveying speech, Bell found a supporter in John D. Runkle, Professor of Mathematics from 1865 to 1902, and from 1868 to 1878, Acting President and President, respectively, of the burgeoning Institute. Edward C. Pickering, Professor of Physics and Director of the Rogers Laboratory of Physics at M.I.T. from 1867 to 1877, offered encouragement and the Institute's laboratory facilities to Bell.

But it was with Charles R. Cross, '70, Professor of Physics from 1871 to his retirement in 1917, that Bell had most contact. It was probably Cross, founder of the Institute's Department of Electrical Engineering in 1882, who showed Bell the Institute's model of the not-too-successful telephone of Reis and who helped Bell in certain experiments in acoustics. Charles A. Morey, a student at Technology from 1872 to 1874, devised the improved form of the phonautograph, an early type of oscillograph, used in these experiments. Late in 1874 Bell described his method of transmitting articulate speech electrically to a number of persons including the 27-year old "Professor Charles R. Cross, of the Institute of Technology, Boston." Both Cross and Pickering testified for Bell in the patent suit brought by the United States against Bell in the spring and summer of 1892, during which an unsuccessful attempt was made to show that Bell was not the inventor of the telephone.



International News Photo

At the White House on January 20, President Truman expressed the nation's thanks to a group of scientists for their work in directing the country's scientific man power and research facilities during the war. Seated, in reading order, are: James B. Conant, President of Harvard University and Chairman of the National Defense Research Committee; President Truman; and Alfred N. Richards, Vice-president in charge of medical affairs, University of Pennsylvania, and Chairman of the Committee on Medical Research. Standing are: Karl T. Compton, President of M.I.T. and member of the National Defense Research Committee; Lewis H. Weed, Director of the Johns Hopkins Medical School, and Vice Chairman of the Committee on Medical Research; Vannevar Bush, '16, President of the Carnegie Institution of Washington, and Director of the Office of Scientific Research and Development; Frank B. Jewett, '03, President, National Academy of Sciences, and member of the National Defense Research Committee; Jerome C. Hunsaker, '12, Chairman, National Advisory Committee for Aeronautics, and member of the Advisory Council of the Office of Scientific Research and Development; Roger Adams, Head of Chemistry Department, University of Illinois, and member of the National Defense Research Committee; A. Baird Hastings, Harvard University, member of the Committee on Medical Research; and Alphonse R. Dochez, Columbia University, member of the Committee on Medical Research.

On May 25, 1876, Bell, who held the post of Professor of the Mechanism of Speech at Boston University, read a paper describing his work "before the 197th Meeting of the Society of Arts, held in the Massachusetts Institute of Technology, in Boston, Mass." It was primarily his experiments, however, that aroused the interest of his colleagues at Harvard as well as at the Institute. On April 20, 1877, after he had demonstrated the telephone at the Philadelphia Centennial, a committee of distinguished men wrote Bell, "confident that the general public of the city in which your researches have been made will be glad to witness a practical exhibition of your telephone under your direction, respectfully request that you gratify this desire of your fellow-citizens at such time and place as may be most convenient to you." This invitation was signed by notables of the time including Harvard's Benjamin Peirce, Professor of Astronomy and Mathematics, Henry W. Longfellow, Professor of Belles-lettres, Oliver Wendell Holmes, Professor of Anatomy, and Charles W. Eliot, President, of Harvard University; William F. Warren, President of Boston University; and Technology's John D. Runkle and Edward C. Pickering, soon to become director of the Harvard Observatory. In response to this invitation Bell gave three lectures in Boston's Music Hall on May 4, 7, and 8, 1877.

It would be pleasant to be able to record that the Institute had a greater claim to the development of the telephone in its early stages. The facts appear to be, however, that Bell's work at the M.I.T. laboratories was limited to experiments in acoustics and did not include electrical experiments. During the 1892 suit Bell stated: ". . . the professors of the Institute of Technology always extended to me the greatest courtesy and placed all their apparatus at my disposal for any experiments I desired to make. So far as I remember, however, the investigations I desired to make at the Institute of Technology, and did make, had reference mainly to the use of the manometric capsule and the phonautograph of Léon Scott, as improved by Mr. Morey of the Institute of Technology."

Judged by modern standards, how quaint was Bell's training for his important work in electricity! Speaking of his education, and particularly of his acquaintance with electricity, Bell remarked: "I rather think the books I used were such as I could pick up at old bookstores. I do not mean to say that it may not be possible that I may have read some of the textbooks on physics . . . but I cannot assert so positively. My knowledge of electrical subjects was not acquired in a methodical manner, but was picked up from such books as I could get hold of, and from such experiments as I could make with my own hands."

In the middle of the Nineteenth Century it was possible for a painter to devise an electric telegraph, and for a teacher of phonetics to evolve a means of reproducing the spoken voice. A century ago, a sufficient amount of hard work and determination might have substituted for academic training, but even then the limitations of the brute force method were recognized.

In a letter to his parents, dated March 18, 1875, Bell tells of a meeting he had with Joseph Henry, Secretary of the Smithsonian Institution, and recounts the interest displayed in telephone experiments by "the Tyndall of America." Bell writes: "I felt so much encouraged by his interest that I determined to ask his advice about the apparatus I had designed for the transmission of the human voice by telegraph . . . I said that I recognized the fact that there were mechanical difficulties in the way that rendered the plan impracticable at the present time. I added that I felt that I had not the electrical knowledge necessary to overcome the difficulties. His laconic answer was, 'Get it.' . . . I cannot tell you how much these two words have encouraged me."

Liquid Diet for the Iron Horse

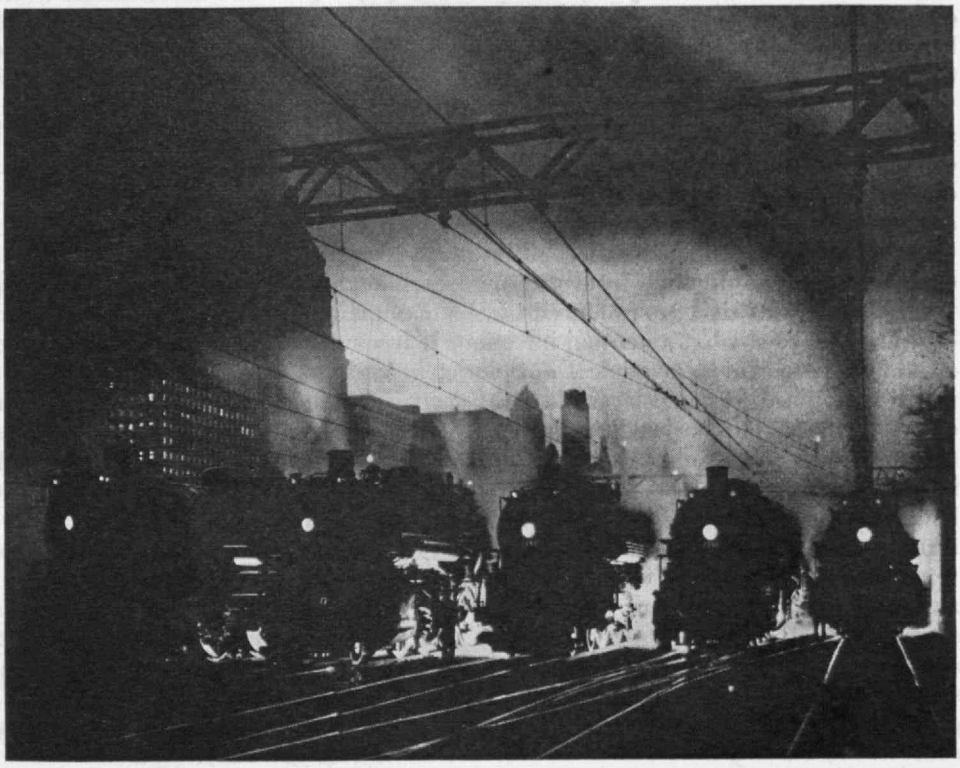
RETIREMENT, as a result of old age, appears to be an early prospect for the smoke-emitting, puffing iron horse. For more than a century it has played a spectacular and pictorial role in this nation's development. Its popularity, long at a high level, probably reached its apex when the first transcontinental railroad was completed on May 10, 1869, with the joining of the Union Pacific and the Central Pacific rails at Promontory Point near Ogden, Utah. As might be expected, there were speeches and ceremonies marking the occasion, and Leland Stanford, President of the Central Pacific, was already looking forward to the time when "three tracks will be found necessary to accommodate the commerce and travel which seek a transit across this continent."

But today's modern pace is too much for the lineal descendants of the *DeWitt Clinton* and the *Tom Thumb.* Continually puffing and out of breath, the steam locomotive of the middle Twentieth Century has developed other signs of senility; it now shows increasing signs of distressing stomach ulcers. The transformed chlorophyll, taken from the mines of Pennsylvania, Illinois, or West Virginia, is too indigestible for the aging locomotives. To be sure, coal never was completely digestible, as the billowing clouds of black smoke reminded us decade after decade. The soot and grime of rail centers have become increasingly annoying, costly to remove, and harmful.

For relatively short hauls between metropolitan centers in well-settled portions of the land, the iron horse first gave way to the electric locomotive, whose diamond-shaped pantograph or smoothly polished shoe took power from an overhead line or a third rail. Within the last decade, the supremacy of the steam locomotive has been increasingly threatened by the sleek, aerodynamically designed, silver-trimmed Diesel locomotive. Today the iron horse, like the buffalo which it drove from the plains decades ago, is itself threatened with extinction. Efficiency, economy, and ease of operation are the principal factors for the rapid rise of Diesel locomotives but other factors have also contributed to the retirement of steam engines. Not the least of these have been strikes in the coal mines which, with increasing frequency and seriousness of consequences, have disrupted rail service, or threatened to do so. Each new strike only served further to emphasize the need to change the sustenance of the iron horse from a solid to a liquid diet.

In 1935 the production of steam locomotives led that of the Diesels by four to one. Today, however, the situation is quite different, for only five per cent of the orders for new locomotives are for the coal-burning steam variety, and the Diesels have the field pretty much to themselves. Even this five per cent would seem to be but a symbolic "whistling in the dark" for it is reported that orders on the books for steam locomotives come from those railroads which derive most of their freight revenue from coal haulage.

The extent to which Diesels are replacing steam locomotives is dramatically brought out by recent statements



The dramatic history of railroads is pictorially portrayed in this unusual illustration of five Illinois Central locomotives. Probably unintentionally so, the overhead feeders symbolize the replacement of solid fuel-consuming locomotives by more efficient engines. Will the youngsters of tomorrow look upon such scenes as this with the same historic perspective as we regard paintings of yesterday's clippers?

Photo by Kaufmann and Fabry Co.

of John W. Barriger, 3d., '21, President of the Chicago, Indianapolis, and Louisville Railway, popularly known as the Monon Line. In a sense, serving as a proving ground for others to follow, the Monon is equipping all of its trains with Diesel locomotives.

All in all, the indications are that the beloved, snorting, puffing, smoke-belching iron horse, which once was undisputed master of long distance transportation, will soon take its place along with the square-rigger, side-wheeler, and horse-drawn carriage as a nostalgic symbol of more leisurely days.

Lysozyme

LYSOZYME is an enzyme found in particularly high concentration in two widely different sites, the whites of hens' eggs and the tears of human eyes. Occurrence of an identical substance in two such apparently unrelated biological fluids is rationalized by the function of lysozyme, which is to destroy bacteria by "lysing" or dissolving the bacterial cell wall. In the egg, lysozyme combats bacteria that penetrate the shell from the outside after the egg is laid, and thus protects the developing embryo during hatching. Likewise, lysozyme helps to postpone spoilage of eggs when man diverts them from their original function of reproducing chickens and uses them as food. In human tears, lysozyme similarly aids in protecting the relatively exposed and delicate eye tissues against bacterial invasion.

The two primary sources of lysozyme, egg white and tears, are both animal in nature; but recently an enzyme having lysozyme activity has also been isolated from a plant source, the latex or sap of Central American trees of the *Ficus* genus. However, this plant lysozyme differs chemically from lysozyme of animal origin. In *Ficus* trees the function of lysozyme has not been established; it may act, like animal lysozyme, as an antibiotic to protect the plant against invading organisms, but it might also be a metabolic agent to break down by lysing certain nutrients, similar to the polysaccharides of the bacterial cell wall that enter into the metabolism of the tree.

It has been suggested that the potentialities of lysozyme for use as a clinical antibiotic, like penicillin, be explored. This would represent a new approach to control of infection, differing not only from antibiotics, such as penicillin or streptomycin that are secretions of one type of microorganism used to combat another microorganism, but also differing from preparations like antitoxins and serums that are produced by the mammalian blood stream to combat an actual infection. If lysozyme should prove useful as a clinical antibiotic, immediate practical application could be made of a recent isolation of lysozyme in pure crystalline form. Lysozyme, like other enzymes and also like the vitamins, was recognized initially by its biological activity, and was studied for a long time in mixed preparations before separation in pure form. Such isolation, now accomplished, lays the groundwork for establishment of the chemical nature of lysozyme, which in turn opens the way to its chemical synthesis. Synthesis is an important step in wide practical application of any biological substance of clinical value, since manufacture by snythesis is usually more productive and cheaper than preparation from biological sources.

500,000,000 Cavities

FOR more than a decade it has been known that the presence of one or two parts of fluorine per million parts of drinking water markedly reduces the amount of tooth decay. Larger fluorine contents lead to a characteristic tooth mottling. It is believed that in many areas, such as the noted Deaf Smith County of Texas, the inhabitants owe their dentist-defying molars to the presence of this element in the water supply.

The suggestion is now advanced that a reverse condition may also exist; the presence of specific chemicals in the water accelerating dental decay. As evidence, the results of a dental survey of two groups of towns in southern New Jersey are brought forth. One group of towns depends on deep wells tapping the Raritan strata, the water containing from 1.4 to 2.2 parts per million of fluorine. The children of these towns require substantially less dental care than normal, and, at a given age level, the longer their stay in these towns, the lower their rate of dental attack.

Two nearby towns also use a fluid called water, which is described as "acid enough to require treatment with alkali," containing "excess iron to the extent that aeration is required to remove it," and carrying "an unusually high content of nitrates." In these towns a directly opposite trend was observed. Not only was the general level of dental caries higher, but the longer a migrant stayed in this area, the more vulnerable to decay his teeth became.

If these findings are substantiated, and if tests now being conducted on the controlled addition of fluorine to water supplies work out as planned, there exists a tremendous field of application. It was recently stated before a meeting of New York dentists that the teeth of the American public currently contain about 500,000,000 cavities, with more than a hundred million new ones being added every year. To carry out the necessary repair and maintenance work on all these teeth is quite beyond the capacities of this country's dentists, even if the public had the necessary time and desire to do so.

The Noble Stinkwood

THERE was a time in this country when a farmer who had a fence, log cabin, or old barn made of red cedar owned a valuable property. The red cedar forests of our southern states were being exhausted, and American manufacturers of lead pencils considered this wood as the only suitable material. Later it was found that the western incense cedar had much the same characteristics, but in the meantime, many a structure built of red cedar had been torn down for conversion into wooden pencils.

A somewhat similar situation now exists in South Africa, where the stinkwood tree, a plant of quite moderate stature as trees go, and outwardly of less than overwhelming appearance, is in strong demand for furniture and decorative purposes. The cutting of these trees from public forests has been forbidden for about a century. A large tree in private hands is said to bring as much as £1,000; a cubic foot of wood will bring as much as four pounds. In the face of such prices, farms are being combed for old wagons, fences, and other structures made of stinkwood (more sweetly known as South African Oak).

Piscatorial Concerto

If, as Submarine Commander in Japanese Waters during the War, You Picked up Unaccountable Underwater Noises at Close Range, Would You Welcome the Babel of Singing Fish?

By Milton B. Dobrin

THE time was the second April Fools' Day after Pearl Harbor. The place was a conference room in the Navy Building at Washington. Thirty civilians and 20 naval officers were discussing a subject which, offhand, might have appeared a fitting one for the day but scarcely a proper one for the Navy, especially in wartime, for conversations were largely centered about the noisemaking characteristics of fish and other forms of marine life.

Nevertheless, the matter was one of very considerable importance to the Navy because noise from fish had recently been found to interfere with the effective operation of the underwater listening devices being used to protect harbors from sneaking enemy craft and to detect enemy submarines at sea. Moreover fish noises threatened to cause premature firing of the acoustic mine mechanisms which the Navy was beginning to use. The purpose of the April 1 conference was to review all that was known about the noise made by fish and Crustacea and to lay out a program of further investigation on the subject. With more knowledge of their habits and the nature of the noise they produced under different conditions, it appeared probable that effective countermeasures to the obstructionism of Pisces might be devised.

As a result of this meeting, a number of expeditions were organized to conduct a systematic study of fish noises along both the East and West Coasts of the United States, as well as in the South Pacific and the Caribbean region. These expeditions provided excellent opportunity to listen to and record sounds which, although common enough in the underwater world, had seldom been heard by human ears.

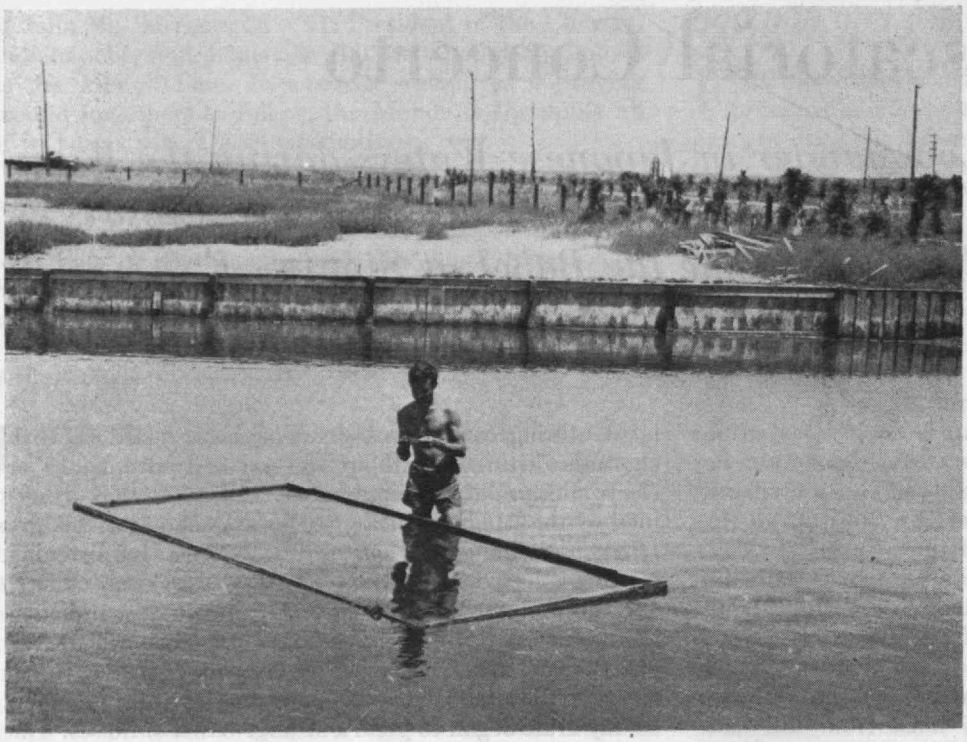
The fact that many fish make noise underwater has long been common knowledge to most fishermen, at least to those working in warm water. Naturalists and ichthyologists have published observations on the subject for more than a century: with a paper on the noise produced by catfish, Louis Agassiz was one of the earliest contributors to knowledge on this subject. Even the names of several common American species, such as the croaker, red drum, toadfish, and hogfish are based on the habit which these fish have of making characteristic noises when pulled out of the water. Vacationers along the bays and sounds of the Carolinas and Virginia, immersing their heads during early evening swims, have heard the fish choruses distinctly without the aid of hydrophones or electronic amplifying equipment. It is said that fishermen of the Mediterranean Sea locate schools of maigre (*Pseudosciaena aquila* one of the drums) by listening for them.

It is, therefore, somewhat surprising that sound men in the armed forces were completely baffled when, five months after Pearl Harbor, hydrophones laid by the Coast Artillery to protect Chesapeake Bay from snooping enemy craft began to yield a strange babel of noises. The sounds resembled a pneumatic drill tearing up asphalt, a steamboat whistle, and the cackle of geese, all at the same time. The noise from ships directly above the 'phones was drowned out completely. After the sound men had checked and re-checked their instruments, they concluded that whatever the weird noises, they were actually in the water and not spurious instrumental effects. The Coast Artillery appealed to the Office of Scientific Research and Development for help, and the O.S.R.D. sent down a party from the United States Navy Underwater Sound Laboratory at New London to listen to the noises. Charles H. Blake, '25, Professor of Biology at the Massachusetts Institute of Technology, was called into consultation and almost immediately identified the major component of the noise as that of croakers, fish which had returned to the Bay with the coming of spring, after having spawned in the open ocean.

Expedition in Search of Noise

The Navy was particularly interested in Dr. Blake's diagnosis because it was at the time developing devices, both of an offensive and defensive nature, which would make use of the sound transmitted underwater from ship and submarine propellers. Among these were acoustic mines, set off under a ship by the noise it generates, listening gear on submarine chasers, and sonic detecting equipment to be used at harbor approaches. Substantial programs to investigate biological water noise were consequently instituted by three Navy research activities. The laboratory at New London and the United States Navy Radio and Sound Laboratory at San Diego were interested in the subject because of its bearing on anti-submarine warfare. The Naval Ordnance Laboratory at





Floating net at Beaufort, N. C., for confinement of fish specimens whose sound is being recorded. The hydrophone is suspended from the near corner of the rectangular frame.

Washington, which designed most of the mines that later blockaded Japan, was interested because it wanted to know what soniferous fish might do to its acoustic mines. Although all of these organizations sponsored numerous expeditions to study fish noises, the present article will deal mostly with the work done by the Naval Ordnance Laboratory, since the author is in a position to describe most of it from experience as an active participant.

Anvil Chorus

The first expedition of the Naval Ordnance Laboratory to obtain data on submarine noise of fish was sent out in the spring of 1942 to measure and record noises made by breakers in the surf off Cape Henry at the entrance to Chesapeake Bay. The surf was readily audible over the hydrophones during the daytime but at night unexpected drilling and rasping noises were picked up which, after conference with the nearby New London party, were attributed to marine life.

It was soon discovered that the peak of the evening noise was reached about 8:30 P.M., at which time the water sounded like a forge shop in full production. This analogy is more than a mere simile because the actual noise level was found to be considerably higher than would be registered by a noise-level meter in a typical forge shop, being of the same order of magnitude as the noise emitted by an airplane motor 15 feet away. After the peak was reached, the level would die away as rapidly as it rose, and long before midnight the water became as quiet as it had been at noon.

There was a pronounced seasonal as well as diurnal effect. The noise was virtually missing during the winter and early spring, when croakers were absent from the bay. Then in late May it would begin, and each evening the level would be higher than the evening before, the variation showing a close correlation with the croaker catch reported by local fishermen. After reaching a maximum late in June (as did the catch), the noise level would decrease until it would be almost gone by mid-summer.

While this work was going on in Chesapeake Bay, a special section was established at the Navy's San Diego laboratory to record noises in the Pacific, particularly off the coast of Southern California. Choruses of croakers were heard here too, but more important to those engaged in the sonar projects at San Diego was the constant crackling noise picked up in shoal waters. After a tireless search, and numerous false leads ranging from oysters to crabs, Dr. Martin W. Johnson, a marine biologist from the University of California, identified the crackling as coming from the snapping shrimp, or *Crangon dentipes*, a tiny crustacean which is highly abundant in coastal warm-water areas the world over. The noise was important in antisubmarine warfare because most of it was found to be in the ultrasonic portion of the acoustic spectrum. Thus it would be likely to interfere with the ultrasonic beams sent out by echo-ranging gear in subchasers, beams which would bounce back again when intercepted by a submarine hull.

All of the observations on biological noise in home waters were interesting and directly useful to the Navy. Even in 1943, however, the observations in domestic waters were not as interesting as information on the noises that might be expected to occur in the East Indies and off the coast of Japan. It was out of the question to send acoustics experts and scientific expeditions into areas to which the sole access was by submarine. The desirability of a comprehensive acoustic survey was indicated, however, by dispatches from a number of our submarine commanders operating in the western Pacific. They reported that, from Borneo to the Marshall Islands, many kinds of clicking, ticking, and droning noises were audible over supersonic listening systems even when no ships were sighted in their periscopes. But such reports, interesting as they were, could not provide the quantitative data needed for the design of acoustic mines and sound gear.

Early in 1943, Rear Admiral Julius A. Furer, '05, the Navy's Co-ordinator of Research (*Continued on page 290*)

Night Aerial Photography

When Radio and Radar Direction-Finding Methods Are Combined with Recent Advances in Night Photographic Equipment Night Reconnaissance Becomes Indispensable

By Harold E. Edgerton

INTEREST in aerial night photography began at M.I.T. quite unexpectedly during the summer of 1939. An unannounced visitor from the Air Forces, who identified himself as Major George W. Goddard of the Photographic Laboratory at Wright Field, came to the Stroboscopic Laboratory and inquired whether the new types of electric-flash equipment then in the development stage could be used as a light source to take photographs at night from airplanes. This potentially new application of flash photography was one to which no serious attention had previously been given because there seemed to be little need for such photography and also because of the considerable weight and bulk of the equipment. Major Goddard thought it might be useful to make photographs from an altitude of a mile or more and asked what help we might be able to render.

A few rough calculations with the inverse square law of light distribution, using the known exposure and weight data for equipment that was modern in 1939, quickly showed that apparatus required to make night photographs at the height of one mile would weigh several tons. Furthermore, the flash lamp would need to be many hundredfold more powerful than any lamp whose construction or design had then been attempted. Our knowledge of almost seven years ago indicated that the required kind of flash lamp could probably be built. But there was also a good probability that the lamp would explode during its first, and only, operation because of the intense heat and high pressure developed when the flash occurred. Even an optimist couldn't feel too encouraged about the prospect of success.

For one concerned with flying, Major Goddard (who bore the title of colonel at the end of World War II) was completely unimpressed by the very considerable weight of nocturnal photoflash equipment. He knew that the new planes, then on the drawing board, would have no difficulty in carrying such heavy equipment, and he offered encouragement and inspiration in the face of other obstacles. Before he left Cambridge, he had committed us to work on the problem and promised that an official request would come through from Dayton.

Thus started a chain of development work which continued until the end of hostilities in August, 1945. By the end of the war, six distinct types of flash photographic units had been perfected for the United States Army and Navy and had seen service on nearly all fronts. They did not represent the first attempts at night aerial photography, however.

Military Need for Night Aerial Reconnaissance

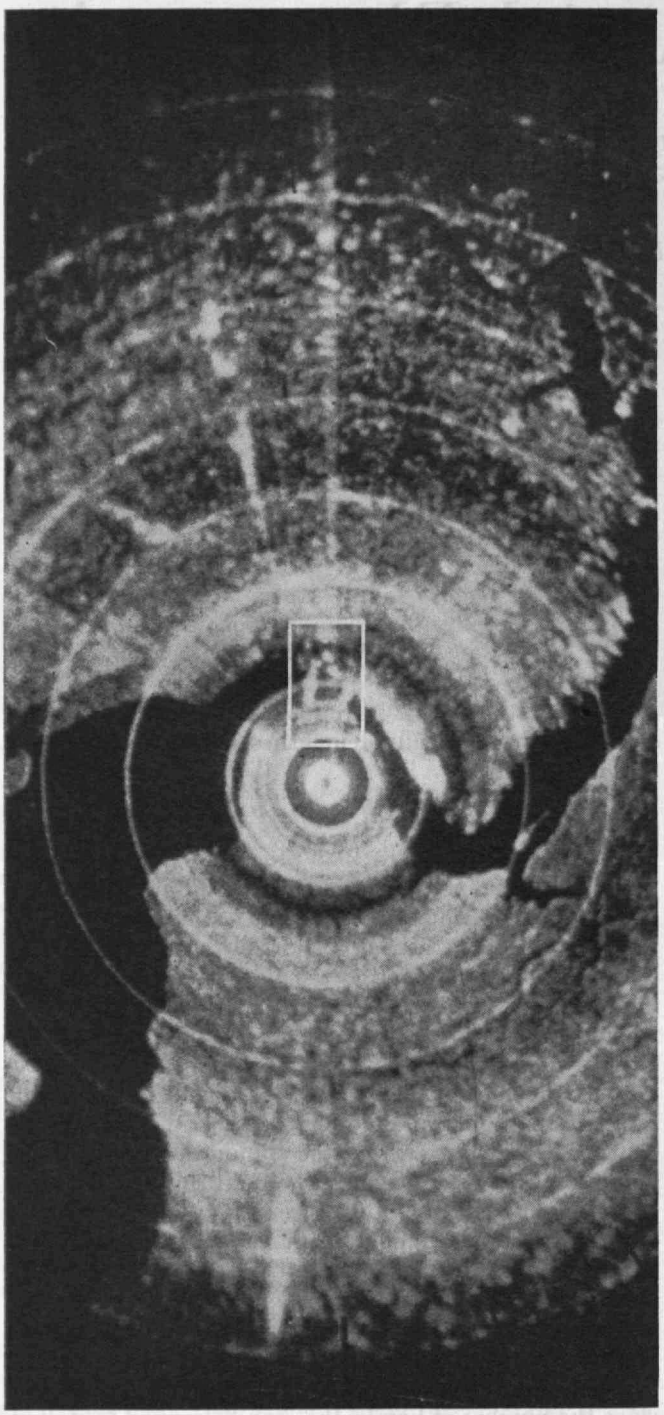
From personal experience as a pilot in World War I, Major Goddard was impressed with the need for night photographic cover, and during his first visit to our laboratories expressed his sincere conviction of the imperative need for night aerial photography. Then, as in World War II which was to come upon us in another two years, the enemy often moved at night, and again and again the High Command had need to know what went on at a particular place at night beyond enemy lines. The only satisfactory solution to such a problem is night aerial photography, the origin of which dates back more than a quarter of a century. A few photographic experiments were made in 1917 and 1918 with improvised flash bombs, but these tests were abandoned after a bad accident which practically demolished one of the buildings at Langley Field.

Two Systems of Night Photography

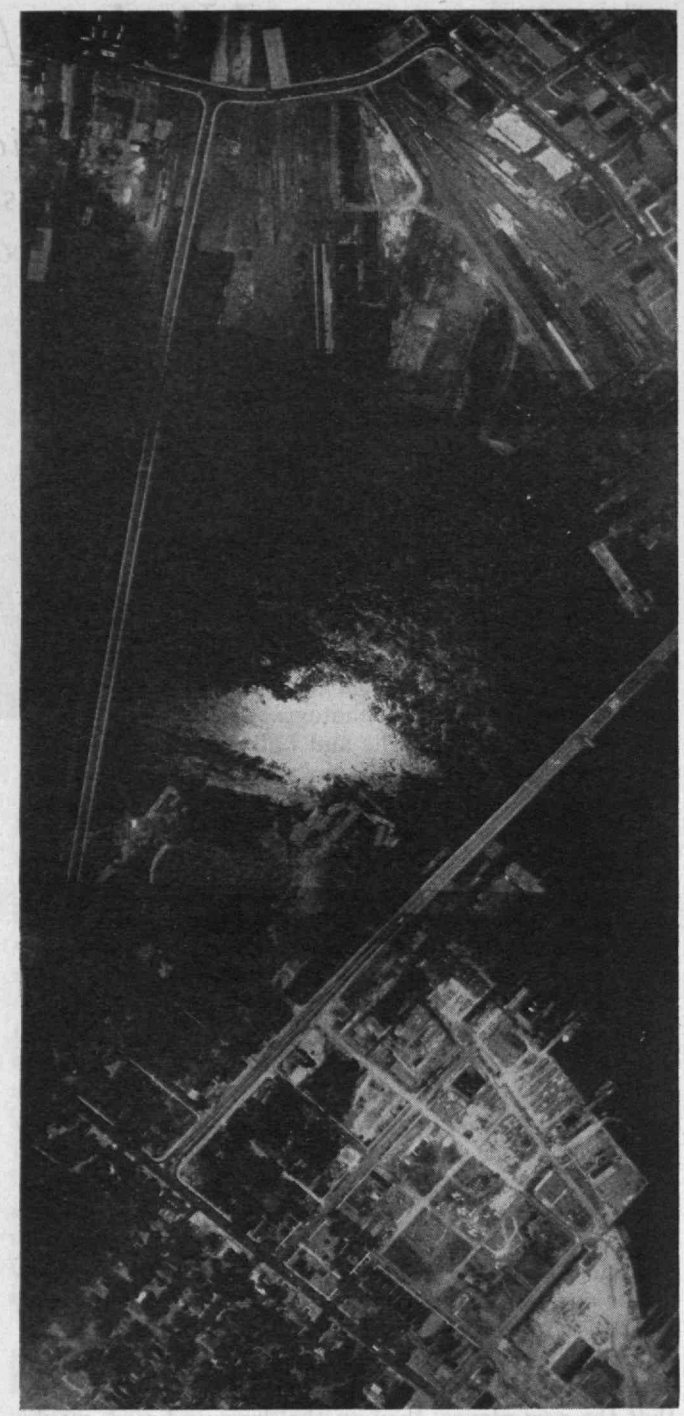
From World War I to 1939 progress in night photography was confined to refinements and improvements of flash-bomb techniques. Originally, the aerial camera shutter was opened when the bomb was dropped and was closed manually after the flash had occurred. An important advance was made in the middle of the 1930's when Goddard proposed that the camera shutter be tripped automatically by a photoelectric system actuated by the light of the bomb. Subsequent developments brought forth the Fairchild night camera with phototube control of the shutter, and the standard 50-pound flash bomb known as the M-46. So well did this photographic complement function that the English adopted the camera as standard equipment for their night reconnaissance work during the recent war.

In spite of apparent success, the flash-bomb method of night photography had several disadvantages. The flash bomb is dangerous because the powder is easily ignited. The number of reconnaissance operations is restricted since the number of bombs that can be carried is limited. The plane can operate only at a given altitude because the time-delay fuses, usually adjusted before take-off, are intended to be dropped from a predetermined altitude. Should there be a cloud layer between the plane and the target, the plane cannot complete its assignment by flying lower because of limitations imposed by the preset fuses.

The electric-flash system overcomes these difficulties since the equipment is not explosive, the number of photographs that can be taken is almost limitless, and the plane carries its own light source and consequently can operate at any altitude. These desirable features are not achieved without some disadvantages, however. Photographs made with the electric-flash system do not have shadows, which are helpful for identifying and indicating the heights of objects. As previously men-



Photograph of radar image showing a portion of Jacksonville, Fla. The plane is flying north and is close to the target — two bridges which can be seen as white lines in the center rectangle. Radar and radio direction-finding techniques were valuable adjuncts in guiding the plane to its proper destination for making night aerial photographs.

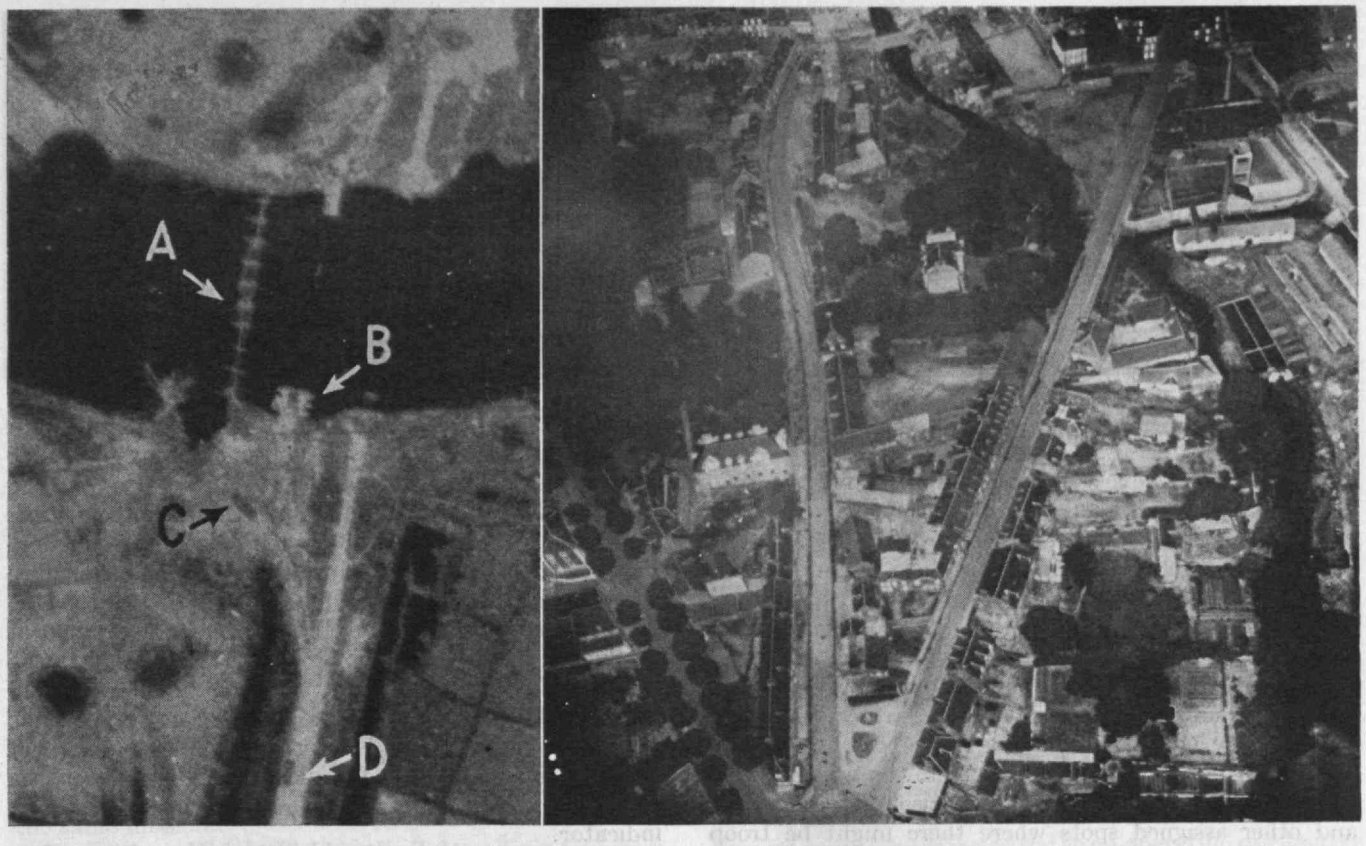


A strip of three electric-flash night photographs taken at Jacksonville, Fla. These three photographs, covering approximately the area marked as a white rectangle in the radar image, show clearly the objective sought — the two bridges across the St. Johns' River. These night photographs were made at an altitude of about 2,500 feet.

tioned, the weight of the flash equipment increases as the square of the altitude at which photographs are to be made, and this must necessarily establish an ultimate limit of usefulness of the electric-flash system. Finally, the considerable electric power requirement of electric-flash photography imposes a substantial load on the electrical system of the plane.

At first thought, the two systems of night photography might be regarded as competitive. It is more accurate to say that they complement each other. Under tactical conditions it was found that one or the other was better suited to photography for a given mission. A totally effective night squadron needs both systems and must be able to switch from one to the other at a moment's notice. The need for both systems was dramatically demonstrated during the invasion of Normandy on June 6, 1944.

On the night of D-Day there was a cloud layer at 3,000



The left-hand illustration is from an enlarged portion of a night photograph taken in Burma of an important crossing of the Irrawaddy River. A temporary footbridge (A) has been built just above the ferry slip, (B). A ferry boat, with Japanese truck in place, ready for crossing is on the lower river bank, (B). Two other trucks (C) and (D) await their turn to cross. The use of the ferry was unknown until this picture revealed the night activity on the river. During the day, the ferry boat was carefully concealed at some distance from the crossing. . . . At the right is a night photograph of an important crossroad intersection in Normandy taken on June 6, 1944. The photograph is significant for the absence of vehicular traffic at this important junction. Certainly German trucks would have been on this road had the Germans expected the Normandy invasion to take place. This, and similar photographs, gave early proof that the Germans were surprised completely by the invasion of Normandy.

feet elevation over all the French area to be photographed, and therefore airplanes equipped with flash bombs were not able to accomplish their missions. A plane with an electric-flash unit was able to go below the clouds and photograph target objectives even though the area photographed was not as wide as that which would have been obtained by the flash-bomb method. Lieutenant Edward Lentcher, a pilot of the 155th Night Photo Squadron, found clouds as low as 800 feet. He banked his plane opposite the targets to get additional oblique coverage and returned with photographs which were of considerable tactical importance and which could not have been made by flash-bomb technique. One of these photographs is shown above, at the right.

Early Tests of Electric-Flash Equipment

The first experimental electric-flash unit for night aerial photography was given its initial trial in a B-18 Army Air Forces bomber in April, 1941, over Boston. This early equipment was normally operated at an altitude of about 2,000 feet, and with a camera covering a 40° cone, a region of land 1,500 feet in diameter could be photographed. With such photographs, buildings, roads, automobiles, and other objects could be easily distinguished and identified in night photographs.

The experimental equipment then was sent to Wright Field to undergo further exhaustive tests to demonstrate its practical utility. On the basis of this preliminary work, a larger and more comprehensive flash unit was designed to fit the B-24 and B-25 airplanes which represented the latest type of craft then available. As soon as the equipment was finished, it was flown to Dayton, and, in flight tests, exceeded expectations of its performance.

It was during these tests that the first opportunity was provided to recognize the rather unusual requirements of aerial night photography for military operations. Ordinarily, the military services depend on daylight aerial photographs to determine details of terrain of enemy territory, the location of enemy troops, guns, supply depots, and so on. Night aerial photography is employed primarily to provide intelligence of the enemy's operations under cover of darkness. Daylight photography is used to learn what force the enemy has; the role of night photography is to reveal how and where the enemy's force is being applied. For this purpose the primary target of night photography is motion; movement of troops and equipment along highways, railroads and waterways over as large an area as possible. So long as road traffic can be revealed in night photographs, excellence of photographic quality is very much less important than increased area of coverage. There is a tendency, therefore, to accept photographs which give the necessary intelligence, even though they may be of poor photographic quality if judged by more customary standards.



Photographing the Desired Objective

Once the early experimental equipment for the B-24 and B-25 planes was perfected, the Army requested models for use in maneuvers. The results of Army tests showed the photographic equipment to be satisfactory and capable of producing pictures well suited to military needs. For a while it seemed that the problem of aerial night photography had been solved. Soon, however, another problem arose; the photographs were seldom of the desired subjects. Night navigation, rather than night photography as such, had become the important problem.

Even in familiar territory where towns were lighted, night pilots had difficulty finding isolated crossroads and other assigned spots where there might be troop activity. Over enemy territory, with towns blacked out, the probability of photographing a particular road intersection appeared to be virtually zero. For this reason there was a lack of interest in further development by the Army who would be the primary user of the system for tactical reconnaissance.

It is now clear, of course, that several of the radar systems then being developed could have been extremely useful in solving the problem of night aerial navigation. Five years ago, however, even those who were frantically busy with the development of radar techniques and systems did not appreciate the full usefulness and capabilities of radar, and the secrecy which surrounded the subject at the time made it practically impossible for those not included in the "inner circle" to learn what was going on, or to take advantage of radar techniques.

Ultimately some of the developments of radio navigation and radar provided the means for precise night navigation which enabled night photographic reconnaissance to play its full part in tactical operations toward the close of the war. This was particularly true of the Gee system of radio navigation, developed in England between 1936 and 1939, in operation by 1941, and a standard method of navigation for British and American air forces from the autumn of 1943 until the end of the war in Europe.

Gee — an Aid to Navigation

The Gee system of radio navigation, to which Loran is similar, is fundamentally a method of radio location by which a plane in flight determines its position by measuring the time required for signals to reach it from two or more stations, separated by about 80 miles, whose radio transmissions are very precisely synchronized. If the signals from the two transmitting stations take exactly the same time to reach the plane, the plane is known to be equidistant from both stations. Its position is at right angles to, and along the bisector of, the straight line joining the two transmitters.

If the plane follows a course such that a constant time difference occurs between the synchronized signals reaching it from the two Gee transmitting stations, it can be shown that the plane will follow a hyperbolic course. Thus, two Gee (or Loran) transmitters are capable of producing a pattern of hyperbolas, each representing a different time difference in wave propagation between the stations. A plane may be guided along any hyperbolic pattern by requiring the navigator to follow a path of constant time difference, as indicated by the position of a mark on the screen of a cathode ray tube, or some similar indicator.

Three synchronized stations, properly located, establish a grid network or system of orthogonal hyperbolas enabling the navigator to determine his position accurately with respect to the Gee stations whose locations are known. The precision with which the navigator can locate his plane varies somewhat with his position relative to the transmitting stations, but the error is usually not appreciably greater than half a mile in either direction.

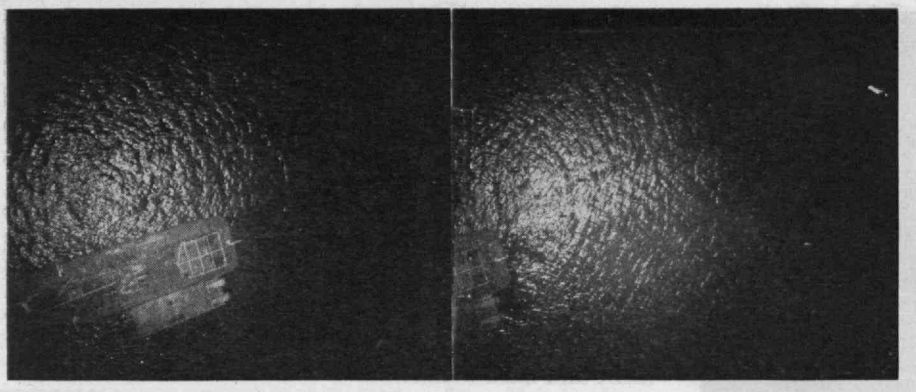
By the time American planes were operating in large numbers in England (in late 1943 and early 1944) the Gee system was in full operation. Gee was an important aid in landing planes in England, and covered the English Channel, the North Sea, Holland, Belgium, Northern France, and other regions in the interior of the Continent. Using ground stations on the English Coast, Gee was an effective aid in bombing the Ruhr. A range of about 200 to 250 miles was obtained for aircraft at 15,000 feet. For low altitude, night reconnaissance work, the range was nearer 100 miles. Providing a means for a plane to locate its position to within half a mile over the entire European region of greatest tactical importance, Gee was just what was required to make full use of night photographic reconnaissance.

But we are ahead of our story.

From Cassino to the Po Valley

Before night aerial photography was effectively teamed up with radio and radar aids to navigation, calls for night photographic equipment frequently came from the front. One of these was especially memorable for the effect it had on the future course of the war and because it was used in an area where the topography was an important and effective aid to aerial navigation at night.

In April, 1944, when our army was stalled below Cassino in Italy, there was a need for night reconnaissance to discover how the Germans were receiving supplies even



A series of five test photographs taken at the rate of three pictures per second at an altitude of 200 feet with flash equipment weighing 150 pounds. The object of such photographs is to show what was attacked by the plane and how close the bomb came to hitting the target. No bombs were dropped in this practice run. Night bomb runs at low altitudes on submarines that surfaced to charge their batteries were very successful at one stage of the war.

though all bridges which might have been effective in military transportation had been destroyed. Lieutenant General Ira Eaker requested some electric-flash equipment for night photography. Colonel H. K. Baisley, then Chief of the Photographic Laboratory at Wright Field, responded by sending a B-24 and two B-25 airplanes equipped with cameras and electric-flash lamps. The author was requested to accompany the mission, to train men to install and maintain equipment, and to assist in applying night photography to the military operations being planned. Corporal Donald Castle, who had spent several months at M.I.T. learning the theory of electric-flash equipment before he went overseas, was assigned to the same mission.

We left from Wright Field in the B-24 and went directly to San Severo, Italy, via the southern route through South America and Africa, which was the route used by the 90th Photo Reconnaissance Wing. In Italy, the B-24 was found to be too slow and too large a plane for effective photographic reconnaissance; it provided too good a target for enemy guns. The photographic equipment from the B-24 was therefore transferred to two faster and more maneuverable A-20 airplanes. After the two A-20's were equipped, enough additional apparatus was still on hand to form the nucleus of a photographic unit which was later formed in England.

Some time was spent in getting the A-20's in readiness and in working out the problem of supplies. Aerial reconnaissance was hampered by lack of planes and replacement parts. Early test flights appeared to show that Italy was entirely covered with olive groves, even including regions which were definitely known to be in the Mediterranean Sea! The difficulty was quickly traced to outdated and poorly stored film, some of which actually had water condensed on the emulsion when the boxes were opened. Most of the film for night aerial photography had come via Africa where it had not been properly stored. We never had film for night photography that was less than a year old.

Nevertheless, after three months' work it was a great satisfaction to learn that the results of two test flights were regarded so highly that similar equipment was requested in England. Captain Calvin Wheeler was the pilot of the first flight mission out of San Severo and Corporal Castle was the photographer, but many more missions followed this initial trip. In all, some 50 night missions were made for photographic purposes while our Army was advancing from Cassino to the Po Valley.

Under favorable conditions, satisfactory night photographs had been made from an altitude of more than 10,000 feet.

The results of night photography in the Italian campaign were sufficiently successful that in May, 1944, a request came from England to assist in outfitting a night photo squadron. The equipment which was not needed in Italy was flown via Africa to Chalgrove, England, where the 155th Night Photo Squadron was being created from a group of former night fighter pilots. Immediately we could sense that something important was in the making. Three days after landing, the first A-20 was equipped with electric-flash equipment and the group of seasoned pilots and photographers were given instructions in the proper use of the photographic equipment.

Most important of all, however, was the prospect of developing night photography to its peak. For the first time we could look forward to the co-operation of effective night photography and precision navigation. Our own Army navigators were being trained to operate the English Gee radio navigation devices, and they quickly learned to appreciate the value of knowing their precise location. During the last part of May, 1944, many training flights were made over England to prepare the crews for the work that we all knew could not be far in the future.

Surprise!

On the evening of June 5, 1944, a tense, earnest atmosphere pervaded as those in charge of the squadron checked over the crew and equipment. We had no advance information, but we did not need it. We knew that practice reconnaissance over England was ended and that the time had come when night photographs of the combat area would be demanded.

Shortly after the take-off of the night photographic airplanes for Normandy, there began the long caravans of C-47 planes with trailing gliders full of invasion troops. These seemingly unending streams of planes passed directly over the Chalgrove Airport at an altitude of 1,000 feet and presented an inspiring sight never to be forgotten by those who witnessed it.

Before the last plane of invasion troops left England, some of the night photo airplanes had returned to England with their valuable cargo of exposed film. The films were rushed through the photographic laboratory for processing but they showed no action on the important crossroads leading into the invasion area. The pilots, anxious to obtain action pictures, were somewhat disappointed at the results, but the High Command was extremely pleased. It knew then, as we all know today, that the Germans had been taken completely by surprise and that, as a result, our invasion operations would be more successful and with fewer casualties than



Rear view of an A-20 airplane showing an electric-flash reflector mounted in the tail

if a formal "reception" awaited our troops in Normandy.

It is difficult to assess precisely the contribution made by night aerial photography to the success of the Normandy invasion, for military intelligence is assembled from many sources. The final decisions and commands are ultimately made known, but the information upon which they are based and the importance of each bit of intelligence cannot readily be evaluated. But it can hardly be doubted that early knowledge that the Germans were taken by surprise — knowledge first furnished by aerial photography — must have had an important bearing on invasion operations, especially immediately after the first landings. But at least one important result did come out of these operations; during the Normandy invasion, the 155th Photo Squadron firmly established the value of radar and radio navigation as an element of night photographic reconnaissance.

In August, 1944, after our troops had an incontestable hold on France, the 155th Photo Squadron moved to Rennes, France, to be nearer military operations as the Allied Armies crossed Europe. The Squadron made four other moves as it followed the action of the Allied Armies across Europe. That the work of this group was of great value is, perhaps, best attested by the commendations from the High Command which this squadron received.

Record of the Battle of the Bulge

One of the outstanding efforts of the Squadron was the photographic work performed over the Ardennes Forest during the Battle of the Bulge in December, 1944. At best, during this time of the year, there are only three or four hours of the day when good aerial photographic reconnaissance can be accomplished by daylight. In the winter clouds shroud the rugged, hilly land of the Ardennes Forest which is 500 to 1,000 feet high. For these reasons it was impossible to make reconnaissance flights during daylight. At night, clouds dissipated and cleared up, so night photography was possible. In fact, night aerial photography was the only possible means of reconnaissance from the time the Battle of the Bulge started, on the night of December 16–17, until December 23, and accordingly there was a very active and concentrated program of night photography, using electric-flash equipment and flash bombs.

Two routes of troop movement and of supply were available to the Germans leading to the spearhead of the Bulge. One of these passed through the pocket controlled by the isolated division at Bastogne and could not be used by the enemy. The other route passed through St. Vith in Belgium. In fact, St. Vith was the center of routes of supply and troop movements as revealed by night photographs. The German effort could be made substantially less effective, therefore, by reducing the transportational value of St. Vith, which was, accordingly, heavily bombed. It is interesting to record that bombing operations on St. Vith were carried out completely on the basis of information obtained from night aerial reconnaissance.

Evaluating Aerial Night Photography

In attempting to assess the value of night photography the question is often asked whether any outstanding new developments in electric-flash photography were made during the war. This question can best be answered by stating that although no radically new systems of operation were devised, there were many improvements of capacitors, flashtubes, and other components. In the aggregate, these improvements resulted in a considerable advance in the performance beyond that which was possible when the program was originated in 1939. As an example of such progress, it may be recalled that experimental units delivered to Wright Field in 1941 were limited to use at altitudes no greater than about 2,000 feet. When the war ended, equivalent photographic performance was obtained at 10,000 feet and, under favorable conditions, usable photographs have been made at 20,000 feet. Certainly a very great advance was made in the effectiveness of night photography when aerial photography was combined with precision methods of navigation.

Night aerial photography using electric-flash equipment was used on nearly all fronts during World War II in a variety of airplanes and for a variety of purposes. Particularly when supplemented by radio and radar navigational aids, night photography demonstrated its usefulness magnificently in Italy and Normandy. From the record of military accomplishments it is now clear that night photography has become an established although difficult art, virtually indispensable in tactical warfare. The peacetime training of our photo reconnaissance pilots will undoubtedly include some activity in the field of night photography. The electric-flash system is preferred for training purposes since the dangers incidental to bombs are avoided. Furthermore, electric-flash photographs can be taken anywhere, whereas with flashlight bomb techniques exposures cannot be made over inhabited areas. (*Continued on page 310*)

A Century of Sleep

When Reviewed in the Light of 10 Decades of Painless Surgery the Faltering Developments and Early Uses of Anesthesia Assume New and Brighter Luster

By Tenney L. Davis

THE luster of great events, like that of great men, shines brightest at a moderate distance. In their own times and places important events seem trivial, but they later develop far-reaching consequences and implications. Their effects furnish proof of greatness, and in general, endure long after the mere luster has faded.

Almost exactly a century ago, in February, 1847, Sobrero reported the discovery of nitroglycerin to the Academies of Torino and Paris. He observed the sweet taste of his fulminating glycerin and its power of producing violent headaches. He demonstrated its explosibility, but was not able to control it. Sixteen years elapsed before it was manufactured and used commercially — by Alfred B. Nobel in Sweden in 1863. Soon thereafter, in 1867, Nobel invented dynamite, the liquid and dangerous nitroglycerin absorbed by fuller's earth by which it was rendered more safe and more tractable. In the same year he devised the fulminate blasting cap by which dynamite could be exploded at will, a device upon which the whole science and art of modern high explosives depends. Two years more, in 1869, improved "straight" dynamite came into being. In 1875, Nobel invented blasting gelatin and gelatin dynamite in which the nitroglycerin is converted into an elastic jelly by the addition of nitrocellulose. Another 13 years elapsed before he used a larger proportion of nitrocellulose to convert nitroglycerin into a stiff, hornlike colloid for use as smokeless powder. Nobel invented Ballistite in 1888, more than 40 years after the discovery of nitroglycerin.

First Evaluations

The history of Nobel's inventions is a story of ingenuity, persistence, and resourcefulness. In the end Nobel was rewarded by great wealth which permitted him to endow the Nobel prizes for advancements in peace, science, and the humanities. If only the first and immediate consequences of Nobel's inventions are considered, the account becomes a history of the explosives industry, of mining, and of military tactics. Nobel started something which made it possible to build the Panama Canal, to take coal out of the earth, to find petroleum and bring it to the surface, to wage war with the newest of weapons, to procure tungsten from which filaments are made for the searchlights of battleships and for the lamps of libraries.

Like Nobel, Sobrero also started something. If one sets out to discuss the consequences which have followed from the simple experiments of Sobrero in 1847, to discuss the relationships and results of the consequences themselves, he will find that he has undertaken a discourse on the social, economic, and cultural life, and the industrial and engineering achievements of a century.

Some other great event, followed through the ramifications of its consequences, will yield another history of the same period, differently focused, differently colored, no less authentic, and perhaps more interesting.

A century ago last autumn, an epoch-making event occurred in Boston, in the Massachusetts General Hospital, in the operating room under the Bulfinch dome. It is described simply and forthrightly on a plaque which is attached to the wall of the room, in language composed by President Eliot of Harvard and Dr. Henry P. Walcott, Chairman of the Trustees of the Hospital:

> On October 16, 1846, in this room, then the operating theatre of the hospital, was given the first public demonstration of anaesthesia to the extent of producing insensibility to pain during a serious surgical operation. Sulphuric ether was administered by William Thomas Green Morton, a Boston dentist. The patient was Gilbert Abbott. The operation was the removal of a tumor under the jaw. The surgeon was John Collins Warren. The patient declared that he had felt no pain during the operation and was discharged well December 9. Knowledge of this discovery spread from this room throughout the civilized world and a new era for surgery began.

The celebration of the centenary of surgical anesthesia occasioned several important publications, important as documentation and history, informative to read, and interesting because they illustrate the diversity of the consequences and relationships which adhere to great events. Notable speeches, worthy of discussion, were made at the ceremonies in Cambridge, but we limit our present review to four printed publications: one from Harvard, two from Yale, and one, a history of anesthesis, providing a cross-section of the history of medicine.

Adventure in Co-operation

Three months before the date of the actual centenary, an article was published in the *Harvard Alumni Bulletin* of July 6, 1946, entitled "The Story of a Hospital. The MGH and the Medical School: an Adventure in Co-operation" by Joseph Garland. The author pointed out that the early history of medicine in Massachusetts is intimately related to the development of the Harvard Medical Faculty and the founding of the Massachusetts General Hospital. "Massachusetts medicine," including ether anesthesia and other contributions to the medicine of the world, "grew through the influence of what Dr. Harvey Cushing called the medical dynasties of the community and hospital." John Warren, one of the founders of the Massachusetts Medical Society, was the first professor of anatomy and surgery at the Harvard

Medical School. He was also a brother of Dr. Joseph Warren, known to every school boy as the hero of Bunker Hill, and father of John Collins Warren who performed the famous first painless surgical operation under ether anesthesia. A Warren of the third generation, Jonathan Mason Warren, assisted his father in that operation, and served on the staff of the Massachusetts General Hospital. Jonathan's son, John Collins Warren, II, was professor of surgery at Harvard, and grandson, John Warren, who died in 1928, — the fifth Warren in line — was associate professor of anatomy at Harvard.

The Garland article discusses the Jackson and Bigelow dynasties, and mentions the Shattucks, the Cabots, the Richardsons, the Mixters, and others. It is filled with references to persons, places, and events which will awake latent associations in the memories of any who grew up in the neighborhood of Boston. It paints a picture of the old horse-drawn ambulance, black with its white horse and polished brass, describes the old Medical School Building on North Grove Street, gives a vivid account of the McLean insane asylum on the Barrell estate in Somerville, on a site now occupied by railroad tracks. Fifty years ago, the asylum was nothing but ruins, broken walls, cellars, tunnels, and underground passages where the boys of Somerville and Cambridge used to play pirates and runaway slaves. Thus, the great event leads deep and far. The article is a first-rate contribution to the history of medicine, and to the cultural history of Massachusetts. It deserves to be preserved where it will be available for the use of future historians.

Intended primarily for the use of future scholars, and obviously destined to be preserved in libraries, are two beautifully printed, book-size, paper-bound publications, Nos. 14 and 15, of the Historical Library of the Yale Medical Library. Both were published on the exact day of the centenary, and issued in consequence of the efforts of the learned, energetic bibliophile and bibliographer, John F. Fulton, Sterling Professor of Physiology at Yale. They are *A Memoir to the Academy of Sciences at Paris on a New Use of Sulfuric Ether* by W. T. G. Morton of Boston in the U.S.A., Presented by M. Arago in the Autumn of 1847, with a Foreword by John F. Fulton* and *The Centennial of Surgical Anesthesia, an Annotated Catalogue of Books and Pamphlets Bearing on the Early History of Surgical Anesthesia.* Exhibited at the Yale Medical Library, October, 1946. Compiled by John F. Fulton, M.D. and Madeline E. Stanton, A.B.†

Unprofitable Discovery

Morton was 27 years old when he made his first public demonstration of ether anesthesia. He had just passed 28 when he completed the *Memoir* addressed to the French Academy, in which he makes a calm and dignified statement of his claims to the discovery, as against those of his onetime partner, Dr. Horace Wells, and of his teacher in dentistry, Dr. Charles T. Jackson. He wrote it after he had learned that Dr. Jackson had twice sent surreptitiously to the Academy at Paris memoranda claiming full credit for the discovery of surgical anesthesia. At the time, Jackson was probably not wholly sound mentally. He wished for prestige and honor, but he also wished for money and a share of the nonexistent profits from the patent which Morton had taken out. Morton's *Memoir* closes with the following paragraph:

> In justice to myself, I should say, that I took out my patent early, before I realized how extensively useful the discovery would be, and beside the motive of profit and remuneration to myself, I was advised that it would be well to restrain so powerful an agent, which might be employed for the most nefarious purposes. I gave free rights to all charitable institutions, and offered to sell the rights to surgeons and physicians for a very small price, such as no one could object to paying, and reasonably to dentists. I had little doubt that the proper authorities would take it out of private hands, if the public good required it, making the discoverer who had risked reputation, and sacrificed time and money, such a compensation as justice required. But as the use has now become general and almost necessary, I have long since abandoned the sale of rights, and the public use the ether freely, and I believe I am the only person in the world to whom this discovery has, so far, been a pecuniary loss.

History of Anesthesia

Morton employed a paid publicity agent, a certain Edward Warren of Palmyra, Maine (not related to Dr. Edward Warren, brother of John Collins Warren) to write and publish a tract in his defense, "Some Account of the Letheon; or, Who was the Discoverer?" Five printings in three editions were published in Boston month by month from March through July, 1847. They contain numerous letters, editorials, and testimonials, now precious documents for the historian, among them in the second issue of the second edition the celebrated letter to Morton from Oliver Wendell Holmes. But the controversy continued. Congressional hearings dragged on for 20 years. The outcome is summarized briefly in a paragraph of the introduction of the *Annotated Catalogue:*

> The controversy was still unsettled when Morton had a cerebral hemorrhage on 15 July 1868, shortly after he had read J. H. Abbot's paper in support of Jackson in the *Atlantic Monthly* for June 1868. Jackson in turn had an acute maniacal attack when in 1873 he stumbled upon Morton's epitaph in Mount Auburn Cemetery: "William T. G. Morton, Inventor and Revealer of Anesthetic Inhalation. By whom pain in surgery was averted and annulled. Before whom in all time surgery was agony. Since whom science has control of pain." Thereafter Jackson, who had completely lost his reason, was confined in the McLean Hospital where he eventually died in 1880.

What a movie could be made from such events!

In January, 1842, Crawford W. Long of Jefferson, Georgia, entertained a party of friends with an ether frolic, a hilarious evening in which a number of cuts and bruises were administered without being felt. Long concluded that ether abolished pain, and about two months later, on March 30, put the matter to the test. After administering ether, he removed a small cystic tumor from the back of the neck of a patient who later testified that he had felt no pain, and who, indeed, submitted to the painless removal of a second tumor on June 6, 1842. Before September, 1846, Long had performed eight surgical operations with ether anesthesia, but he published no accounts of them until December, 1849, when, having heard of the controversy over Morton's claims, he contributed a short paper to the *Southern Medical and Surgical Journal.* (*Continued on page 308*)

* New York: Henry Schuman, 1946. 24 pages. $1.50.

† New York: Henry Schuman, 1946. 102 pages. $4.00.

Too Few, Too Late

Developed Too Late in the War To Be Useful to the Enemy, a Group of German Remotely Controlled Rockets Might Have Become Formidable Weapons Against the Allies

By Willy Ley

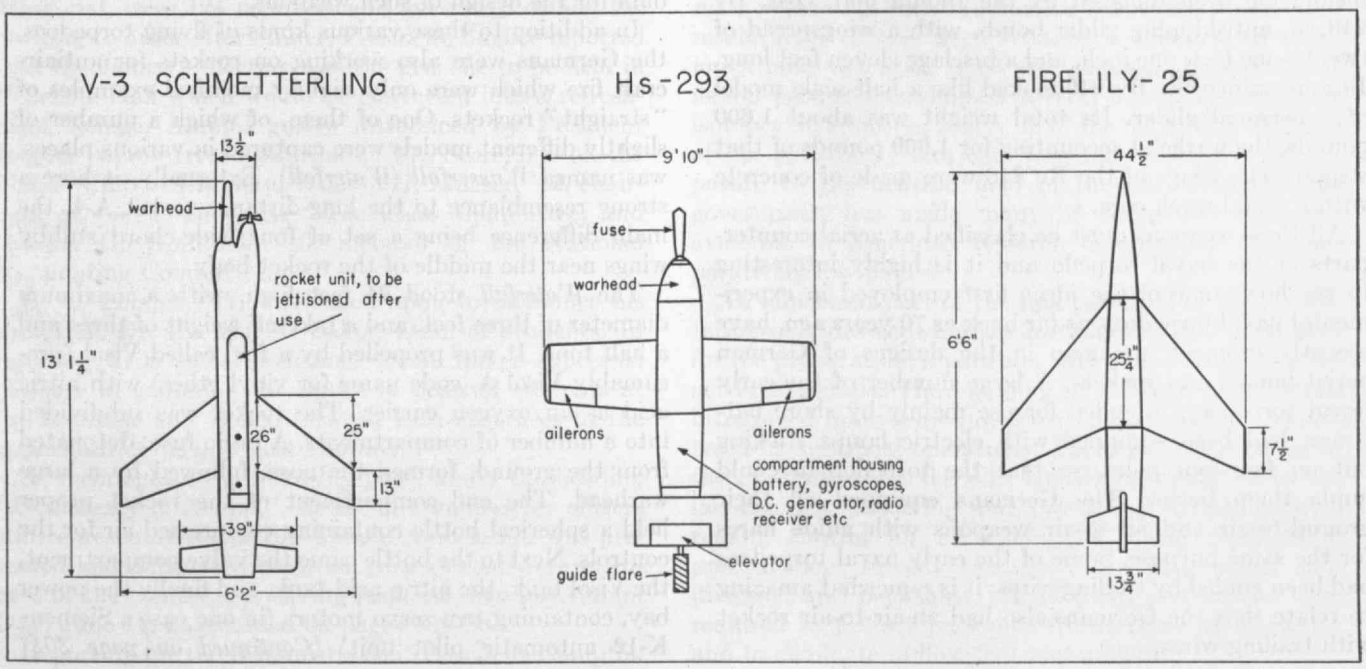
ONE year before the Russian and American Armies met inside Germany, one of the research chiefs of Junkers Flugzeug und Motoren Werke, (identified only as Professor Wagner) informed a selected group of German army officers and Nazi party officials that the problem of Allied bombing raids had been solved. He said that prior to 1944 the Royal Air Force Bomber Command and the American bombing fleets operating from British bases might have impeded war production and transportation but such operations no longer became possible with the development of a new kind of antiaircraft rocket, ground launched and guided by means of radio with the aid of sighting and acoustic devices. Each launching of one of these weapons was to be so accurate that it would account for a British or American bomber. What could be more simple or more satisfactory?

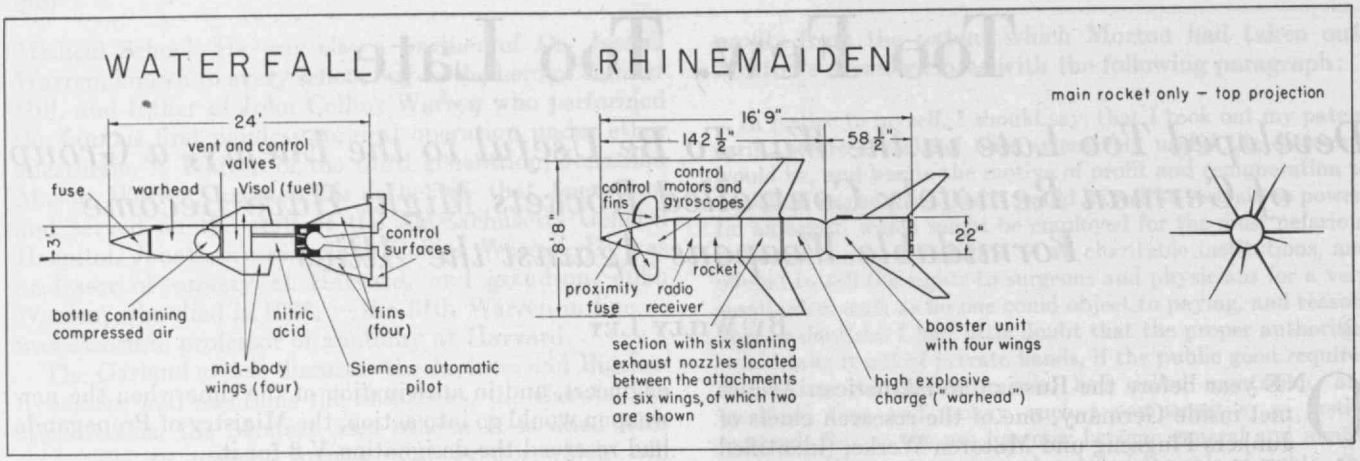
Of course the new weapon could not prevent the English and the Americans from building bombers. It could not even prevent them from sending these bombers against targets in Germany. But once the bombers got near their targets only one Junkers antiaircraft rocket would be needed to dispose of each Allied bomber. The Germans had reduced an important military problem to a mere matter of production — and there could be no doubt that Germany would produce more rockets than Great Britain and the United States could produce bombers and train crews for them.

The weapon about which such hopeful remarks were made was called the *Schmetterling* (*Butterfly*) by the engineers, and in anticipation of the time when the new weapon would go into action, the Ministry of Propaganda had reserved the designation V-3 for it.

One year later the *Schmetterling* was still not in action, but it was ready for mass production and the Allied Armies captured a number of test models and even a few production models. In appearance, the V-3 was a small airplane, thirteen feet, one and a quarter inches long, with a wing span of six feet, two inches. The fuselage, thirteen and a half inches in diameter, had a forked nose. A long conical warhead was attached to the port side of the odd nose and, at starboard, a six and a half inch four-bladed impeller activated the electrical devices. The fuselage was given over to the various control devices and the fuel tanks, but it did not carry a rocket motor. The fuel was burned in two rocket units, which operated either together or separately. They were attached on top and below the fuselage and were jettisoned when expended. The extreme tail end of the fuselage carried a guide flare.

The *Schmetterling* was extremely fast, being capable of attaining a maximum speed of 620 miles per hour with a range of approximately 30 kilometers (20 miles) and having a ceiling of 50,000 feet. One of the interesting features of the mass production model was the wing which was cast in one piece of light metal alloy. It consisted of six main ribs, main spar and trailing edge, with a tubular attachment spar. This structure was then covered with thin aluminum alloy sheet.





It appears that about the spring of 1943 — two years before V-E Day — all German aircraft manufacturers and some armament manufacturers received instructions to concentrate on the development of antiaircraft rockets, guided missiles which were either ground launched or carried aloft by defending aircraft. Consequently, the V-3, or *Schmetterling*, was only one of a great number of such developments.

The Henschel, Hs 293, antishipping rocket bomb, had been the first of these missiles. It was used for a short time against Allied convoys and, although not too accurate, it did disable or destroy several Allied merchantmen. A later development, unfinished at the time the Henschel factories fell into Allied hands, was the Hs 298. It was smaller than the 10-foot Hs 293, having a wing span of only four feet, two and three-quarters inches and a length of six feet, seven inches. Its launching weight, 210 pounds, was 140 pounds less than that of the *Schmetterling*. The nose arrangement of the Hs 298 was essentially the same as that of the *Schmetterling*, except that the warhead was located above the impeller.

While the *Schmetterling* was a ground launched, antiaircraft weapon, the Hs 298 was launched from an airplane. Its anticipated use was against Allied bombers, but presumably it could also have been used against surface vessels or ground targets. The old Hs 293 had meanwhile been replaced by the Blohm und Voss, Bv 246, an antishipping glider bomb, with a wingspread of twenty-one feet, one inch, and a fuselage eleven feet long. In appearance the Bv 246 looked like a half-scale model of a personal glider. Its total weight was about 1,600 pounds, the warhead accounting for 1,000 pounds of that weight. The wings of the Bv 246 were made of concrete with a metal mesh core.

All these weapons must be classified as aerial counterparts of the naval torpedo and it is highly interesting to see how some of the ideas first employed in experimental naval torpedoes, as far back as 70 years ago, have recently cropped up again in the designs of German aerial bombs and rockets. A large number of the early naval torpedoes, intended for use mainly by shore batteries, had been equipped with electric lamps sticking out on four-foot poles, so that the torpedoman could guide them better. The Germans equipped all their ground-to-air and air-to-air weapons with guide flares for the same purpose. Some of the early naval torpedoes had been guided by trailing wires; it is somewhat amazing to relate that the Germans also had an air-to-air rocket with trailing wires.

The trailing-wire weapon was the X-4, a liquid fuel rocket propelled by hydrazine hydrate and alcohol and intended to be released from defending planes against bombers. The rocket was six feet, eight inches long. It had four tail fins and, in addition, four short wings near the center of the body. From tip to tip these short wings spanned one foot and seven inches. The diameter of the rocket itself was eight and a half inches, and the warhead carried by the rocket weighed 50 kilograms (110 pounds). When released from the bomb bay of the defending plane, the X-4 forged ahead under its own power with more than twice the speed of the airplane. By means of two guide flares attached to one set of opposing wings, the pilot in the defending plane could watch the rocket and could guide its path by radio control. The other set of two opposing wings carried 24-inch streamlined bobbins, each holding six kilometers (about four miles) of fine, insulated copper wire through which electrical impulses were sent to the rocket's control mechanism.

Another one of the winged aerial torpedoes which the Germans devised too late for use in World War II was the *Feuerlilie 25* (*Firelily*) which had been developed by the Hermann Göring Research Institute. The *Firelily*, propelled by a powder rocket with a burning time of six seconds, was not meant as a weapon by itself, but served merely as a research instrument with which to gather data for the design of such weapons.

In addition to these various kinds of flying torpedoes, the Germans were also working on rockets for antiaircraft fire which were only slightly modified examples of "straight" rockets. One of them, of which a number of slightly different models were captured in various places, was named *Wasserfall* (*Waterfall*). Externally, it bore a strong resemblance to the long-distance rocket A-4, the main difference being a set of four wide-chord stubby wings near the middle of the rocket body.

The *Waterfall* stood 24 feet high, with a maximum diameter of three feet, and a take-off weight of three and a half tons. It was propelled by a fuel called Visol (presumably Visol A, code name for vinyl ether) with nitric acid as an oxygen carrier. The rocket was subdivided into a number of compartments. A radio fuse, detonated from the ground, formed the nose, followed by a large warhead. The end compartment of the rocket proper held a spherical bottle containing compressed air for the controls. Next to the bottle came the valve compartment, the Visol tank, the nitric acid tank, and finally the power bay, containing two servo motors (in one case a Siemens K-12 automatic pilot unit) (*Continued on page 304*)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Family Tradition

THIS month The Review reinstates a custom, unavoidably broken during the war, of listing the names of those who carry on family tradition and "Come Back to Tech" to prepare for careers in science, engineering, and architecture. As shown in the tabulation below, this year 21 sons follow in the footsteps of their fathers in enrolling at the Institute:

Son	*Father*
Clifford S. Abrahamson	Clifford O. Abrahamson, '25
Frederick W. Adams, Jr.	Frederick W. Adams, '21
Philip M. Alden, Jr.	Philip M. Alden, '22
Stephen R. Arnold	Robert M. Arnold, '22
David W. Chaffin	Warren L. Chaffin, '20
Clarence M. Cornish, Jr.	Clarence M. Cornish, '24
Herbert C. DeStaebler, Jr.	Herbert C. DeStaebler, '21
Richard T. Hall	Charles L. Hall, '15
Van Court M. Hare	Van Court M. Hare, Jr., '23
George L. Hildebrand	Lee E. Hildebrand, '27
Richard S. Holmgren, Jr.	Richard S. Holmgren, '19
Paul A. Lobo	Walter E. Lobo, '26
Robert C. Loesch	Willard G. Loesch, '21
John H. MacMillan	Henry J. MacMillan, '24
James R. Maxwell, 3d.	James R. Maxwell, Jr., '22
Frederick D. Newell	Joseph S. Newell, '19
William C. Reed	Charles S. Reed, '16
Richard P. Sabin	Palmer Sabin, '15
Stephen H. Senzer	Sidney Senzer, '21
Herbert P. Sontag	Herbert P. Sontag, '25
Sherwood B. Stockwell	Ernest F. Stockwell, '22

Radiochemical Industry

PRESENT at the 254th meeting of the Alumni Council, held on January 27, in Pritchett Hall of Walker Memorial, were 124 members and guests. In calling the meeting to order after dinner, President Bugbee reported that the January meeting was the last one to be held in Pritchett Hall which would be converted into a refreshment lounge. Alumni guests introduced by President Bugbee were Arturo Marqués, '27, Secretary of the M.I.T. Club of Uruguay, William H. Mueser, '22, chairman of the Twenty-Five Year Class Committee, and Gordon G. Holbrook, '10, member of the National Nominating Committee.

H. E. Lobdell, '17, was called upon to introduce his successor, Dr. Everett M. Baker, Dean of Students. In response to a genial welcome, Dean Baker expressed pleasure in assuming the duties of dean of students at the Institute and looked forward with eagerness to the opportunities his new post afforded.

As recorded on the following page, under the heading "Democracy in Action," the list of nominees for officers and representatives of the Alumni Association was presented and affirmatively voted. Also elected were members of the committees having responsibility for Alumni Day, June 14, as recorded on pages 284–285.

Reporting for the Administration, President Compton enumerated four recent developments affecting the Institute's management. Recently introduced in the State Legislature was a bill designed to limit to 35 per cent of the total enrollment the number of students normally residing outside of Massachusetts. The opposition from Massachusetts colleges and universities to this bill was so strong that the bill was reported unfavorably in the Legislature. Because of expenses of reconversion, the Institute's operating deficit is expected to be $370,000 for the year. A program of student counseling is being put into operation, the objective of which is to obtain a better distribution of students among the various courses or departments. At present a few departments, such as those of Electrical Engineering, Physics, and Aeronautical Engineering face the prospect of having more students than can be adequately accommodated, whereas facilities exist for more students in such courses as Biology, Marine Engineering, Meteorology, Geology, and Economics. Dr. Compton also reported that Mrs. William H. Kales, wife of the late William H. Kales, '92, a former member of the Corporation, had agreed to underwrite the cost for expanding the facilities of the Kales Clinic to serve as a first-class eye, ear, nose, and throat clinic. The Kales Eye Clinic was dedicated on Alumni Day, June 8, 1946, as reported in the July, 1946, issue of The Review, and will soon be expanded as indicated above.

President Bugbee then introduced Dr. Charles D. Coryell, Professor of Chemistry at M.I.T. who, during the war, had charge of fission products at Oak Ridge, Tenn. Dr. Coryell gave an illustrated talk on "The Radiochemical Industry" in which it was shown that the successful operation of the chain-reacting pile on December 2, 1942, had created a whole new field in large scale operations with radioactive materials. Spectacular results have already been attained in this field to which much more attention must still be given, however. The fission products encompass several hundred radioactive isotopes; in addition, nearly all of the remaining elements of the periodic system can be made radioactive by exposure to the neutron field of the pile. Recently the government has made many of the active materials available to American research organizations at comparatively low prices.

An important part of the talk consisted of the presentation of slides showing the installations and apparatus for the preparation, separation, and distribution of radioactive materials. The handling of radioactive materials introduced many new problems not previously encountered in industrial operations. These include removal of the materials from the pile, transfer of materials to the laboratories, dissolving and processing operations with remote control for all operations, using methods of precipitation, solvent extraction and adsorption, subdividing, and packaging. At all times precautions were required to protect personnel from excess radioactivity and to eliminate radioactive contamination.

It is expected that further expansion will occur in the applicability of radioactive materials. There is great need for new apparatus, new techniques, and new procedures. These opportunities and needs should be a challenge to our technical abilities.

Democracy in Action

INTO the mails this month will go ballots for the annual election of officers and representatives of the 40,000 Alumni of the Massachusetts Institute of Technology. Nominee for the presidency of the Association, to be elected this spring, is Raymond Hall Blanchard, '17, X, Vice-president in charge of manufacturing and Director of the Hood Rubber Company, Watertown, Mass., a division of the B. F. Goodrich Company.

The Association's National Nominating Committee — consisting of Robert S. Williams, '02, chairman, Albert W. Higgins, '01, Ralph C. Robinson, '01, Fred W. Morrill, '07, Harry L. Havens, '09, Gordon G. Holbrook, '10, Irving W. Wilson, '11, Robert C. Erb, '17, Charles A. Williams, '21, and Charles H. Toll, Jr., '23 — nominated for election to the vice-presidency of the Association for two years John A. Lunn, '17, II, Dewey and Almy Chemical Company, Cambridge, Mass. Nominees for the election to posts on the Executive Committee for two years are: Horatio L. Bond, '23, XV, National Fire Protection Association, Boston, and Dwight C. Arnold, '27, XV, Stevens-Arnold Company, Inc., South Boston.

Named for alumni term membership on the Corporation of the Institute for five-year terms are: Harold Bugbee, '20, X, XV, President, Walter B. Snow and Staff, Inc., Boston, and retiring President of the Alumni Association; James McGowan, Jr., '08, V, President, Campbell Soup Company, Camden, N. J.; and C. George Dandrow, '22, IX-B, Vice-president and General Sales Manager, Industrial Products Division, Johns-Manville Sales Corporation, New York City.

To succeed Messrs. Higgins, Havens, and Toll, new representatives on the National Nominating Committee to be elected this year (one from each district) are: *District 8:* Oscar G. Thurlow, '04, I, The Commonwealth and Southern Corporation, Birmingham, Ala.; Jonathan A. Noyes, '12, II, Sullivan Machinery Company, Dallas, Texas; Van Court M. Hare, Jr., '23, IV, Tennessee Valley Authority, Knoxville, Tenn.; *District 9:* Carl J. Trauerman, '07, III, Mining Association of Montana, Butte, Mont.; Alfred E. Perlman, '23, XV, Denver and Rio Grande Western Railroad Company, Denver, Colo.; Stephen L. Macdonald, '39, IV, architect, Salt Lake City, Utah; *District 10:* James O. Greenan, '11, III, Greenan and Company, Inc., Reno, Nev.; Henry C. Gunning, '26, XII, University of British Columbia, Vancouver, B. C.; Charles S. Camplan, '31, XVII, United States Inspection Division, Portland, Ore.

Nominees for Class Representatives on the Council: George M. Tompson, '73, John C. Runkle, '88, Frederic H. Keyes, '93, Edward S. Chapin, '98, James A. Cushman, '03, Joseph W. Wattles, 3d, '08, R. Charles Thompson, '13, F. Alexander Magoun, '18, George A. Johnson, '23, Arthur A. Nichols, '28, Robert M. Kimball, '33, Albert O. Wilson, Jr., '38, and Frederick G. Perry, Jr., '43.

Alumni Day, 1947

RAPID strides are being made in the preparations for Alumni Day, Saturday, June 14, when Technology Alumni will return to their alma mater for a luncheon in the Great Court, an afternoon session on "Aviation: Today and Tomorrow" at which leaders in the aviation field will speak, an inspection of laboratories, informal departmental receptions, and the popular and informal "Stein-on-the-Table" banquet at the Hotel Statler in the evening. Many classes whose numerals end in two or seven will hold reunions in conjunction with Alumni Day. The interests of wives of Alumni who attend class reunions and Alumni Day activities will be taken care



FOR PRESIDENT

. . . of the Alumni Association, Raymond H. Blanchard, '17, X, has been nominated for election for the coming year. Mr. Blanchard has served his company since 1917, in 1932 advancing to his present position of vice-president in charge of manufacturing, and director of the Hood Rubber Company, a division of the B. F. Goodrich Company, Watertown, Mass. In World War I, Mr. Blanchard served as a sergeant in the Chemical Warfare Service. During the recent war, he was a member of the Greater Boston War Manpower Committee and the Mayor's Citizens' Committee. He also served on the National War Stabilization Board for Region I, and for several years was a member of the Committee on Industrial Relations for the Boston Chamber of Commerce. He is a director of the First National Bank of Malden, of the Norfolk and Dedham Mutual Fire Insurance Company, Dedham, and of the Massachusetts Safety Council, and a trustee of the Melrose Savings Bank, Melrose, Mass. In his professional field, Mr. Blanchard is a member of the executive committee of the Executive Club of the Boston Chamber of Commerce; the manufacturing committee of Rubber Manufacturers' Association, Inc.; the American Institute of Chemical Engineers; American Chemical Society; and the Engineering Societies of New England. He has also been active in alumni affairs and was vice-president of the Alumni Association, 1944–1945; member of the Visiting Committee on the Department of Economics and Social Science, 1940–1946; chairman of the M.I.T. Alumni Postwar Placement Committee; and chairman of Alumni Day, 1942.



Photo by the Phillips Studio

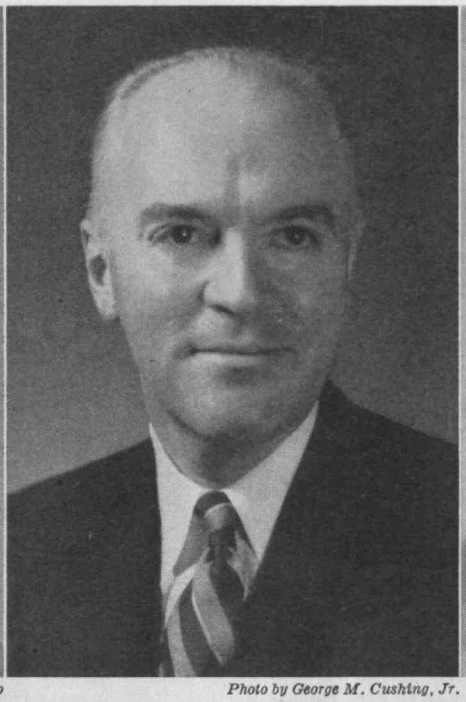


Photo by George M. Cushing, Jr.



TO THE CORPORATION

. . . for a five-year term as representatives of the Alumni Association, the National Nominating Committee has selected three prominent Technology graduates. From left to right they are: James McGowan, Jr., '08, V, President of the Campbell Soup Company, Camden, N. J.; Harold Bugbee, '20, X, XV, President of Walter B. Snow and Staff, Inc., Boston; and C. George Dandrow, '22, IX-B, Vice-president and General Sales Manager, Industrial Products Division, Johns-Manville Sales Corporation, New York City.

of by an entertaining program for the ladies, who will also have a banquet of their own.

Parke D. Appel, '22, Alumni Day chairman, announces that plans for the development of Alumni Day activities are in the hands of ten well-selected committees now putting forth their best efforts to create an outstanding occasion. The membership of these committees is as follows: *Banquet:* William W. Garth, '36, chairman, Edmund B. Fritz, '32, James B. Smith, '32, Robert L. Johnson, '38, and John L. Danforth, '40; *Class Day:* John A. Hrones, '34, chairman, Eugene Mirabelli, '19, and George A. Wilson, 10–44; *Exhibits:* Herbert L. Beckwith, '26, chairman, John R. Markham, '18, John E. Burchard, '23, Edward S. Taylor, '24, C. Fayette Taylor, '29, and Gyorgy Kepes, Staff; *Ladies' Program:* Mrs. William H. McAdams, chairman, Mrs. Parke D. Appel, Mrs. Charles B. Breed, Mrs. Harold Bugbee, Mrs. Karl T. Compton, Mrs. Bradley Dewey, Mrs. Leicester F. Hamilton, Mrs. J. Rhyne Killian, Jr., Mrs. Larcom Randall, Mrs. Earl Stevenson, Mrs. Albert N. Walker, Mrs. Glenn C. Williams, and Mrs. Henry E. Worcester; *Luncheon:* John B. Wilbur, '26, chairman, A. Flint Taylor, '26, William J. Kirk, '28, and Ariel A. Thomas, '36; *Publicity:* Ralph T. Jope, '28, chairman, Henry B. Kane, '24, George I. Chatfield, '28, James Donovan, '28, Beverly Dudley, '35, and John J. Rowlands, Staff; *Registration:* Wolcott A. Hokanson, Staff, chairman, John N. Higgins, '31, and Donald P. Severance, '38; *Symposium Arrangements:* Donald Whiston, '32, chairman, Albert J. O'Neill, '32, Joseph Bicknell, '34, and William L. Root, '43; *Transportation and Hotel Accommodations:* Emmons J. Whitcomb, '11, chairman, Malcolm S. Stevens, '34, and R. Dixon Speas, '40; *Ways and Means:* Delbert L. Rhind, Staff, chairman, Carl M. F. Peterson, '29, and Horace S. Ford, Staff.

Professor Jerome C. Hunsaker, '12, will act as the presiding chairman at the symposium where internationally known leaders will discuss "Aviation: Today and Tomorrow." In keeping with the theme of the symposium, the exhibits, lectures, and displays at the Institute will place special emphasis on aeronautics. There will be demonstrations in the Wright Brothers Wind Tunnel and the Gas Turbine Laboratory, and exhibits on communications and navigational aids in aeronautics will be displayed throughout the Institute.

At 7:00 in the evening the Hotel Statler will be the scene of the ever popular M.I.T. banquet. There will be stimulating addresses, of course. In addition, those who attend the banquet will receive a newly designed stein to add to those of former years as a memento of the memorable occasion of Alumni Day, 1947.

As usual, Alumni Day has been planned in conjunction with commencement exercises which take place on June 13.

Faculty Appointments

RECENT appointments to the staff with the rank of professor include William T. Martin, Mathematics Department; and Lieutenant Colonel Kenneth W. Holbert, Military Science Department.

Appointments to associate professorships include Lieutenant Colonel Raymond S. Crossman and Major Jack F. Lane, both of the Military Science Department; and Leo L. Beranek, Electrical Engineering Department.

New appointments to the rank of assistant professor are Major John C. Bolton, and Captain W. T. Whittemore of the Military Science Department; and Edmond P. Garvey, Electrical Engineering Department.

Rodney H. Smith, '43, has been promoted to the post of Assistant Professor in Aeronautical Engineering.

Technical Director of Acoustics

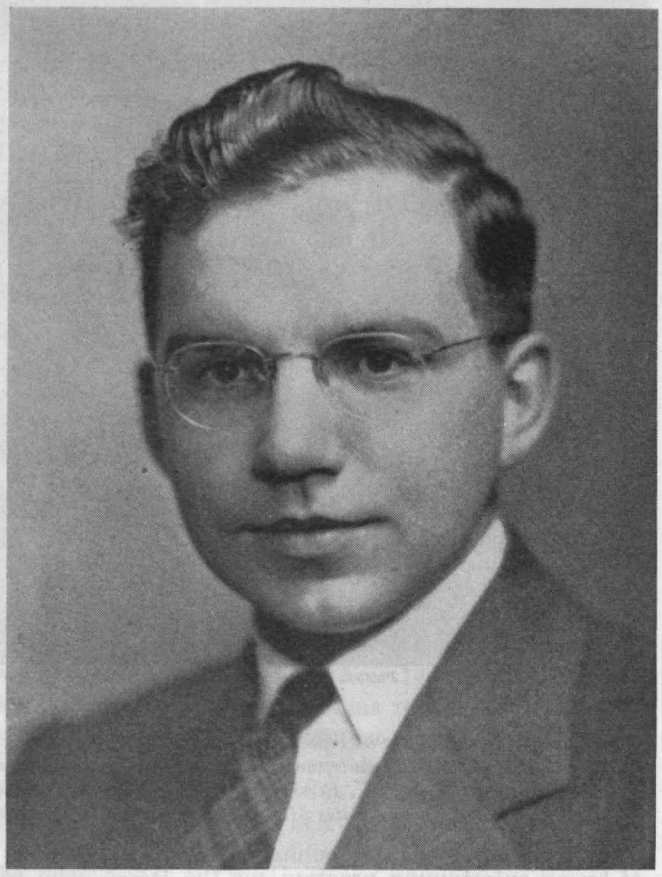
THE appointment of Dr. Leo L. Beranek, formerly director of the Electro-Acoustic and the Systems Research Laboratories of Harvard University, as Associate Professor of Communications Engineering and Technical Director of the Institute's Acoustics Laboratory, has been announced by President Compton. As technical director of the Acoustics Laboratory, Dr. Beranek will represent the Electrical Engineering Department, collaborating with Dr. Richard H. Bolt, who is director of the Acoustics Laboratory.

Dr. Beranek is a native of Solon, Iowa, and was graduated from Cornell College, Iowa, in 1936. He then entered Harvard University for graduate studies and was awarded the degree of Master of Science in 1937 and his doctorate in 1940. Dr. Beranek was an instructor at Harvard from 1940 to 1943 when he was appointed director of the Electro-Acoustic Laboratory. From 1945 to 1946 he also held the post of director of the Systems Research Laboratories. In that year he was appointed a John Simon Guggenheim Fellow, and has since carried on advanced studies at Harvard and at the Institute.

During his graduate career at Harvard, Dr. Beranek held the Gordon McKay Scholarship from 1936 to 1938 and the Parker Fellowship from 1939 to 1940. Last year Cornell College awarded him the honorary degree of Doctor of Science.

Dr. Beranek has won wide recognition as an authority in acoustics and communications engineering, and has made notable contributions in theoretical and applied acoustical science. He is represented in the literature of acoustics by numerous papers and articles. In 1944 he was presented with the biennial award of the Acoustical Society of America for outstanding contributions to acoustics.

Dr. Beranek is a fellow of the American Physical Society and a fellow and member of the editorial board of the Acoustical Society of America; a senior member of the Institute of Radio Engineers, and a member of the American Association for the Advancement of Science, as well as Sigma Xi.



On February 1, Dr. Leo L. Beranek assumed new duties at the Institute as Associate Professor of Communications Engineering and Technical Director of the Acoustics Laboratory.

Report on Mechanical Engineering

THE Visiting Committee on the Department of Mechanical Engineering * met at the Department headquarters on April 2, 1946. The Committee inspected the space and facilities at present assigned to the Department with reference to current utilization and future changes and developments. In particular, the Committee visited the several laboratories of the Department, met the staff member in charge of each, and discussed the function of each laboratory in the educational program of the Department. The laboratories visited were those devoted to Machine Design and Drawing, Dynamics and Control, Fluid Mechanics, Cavitation, Heat and Power, Heat Transmission and Measurement, Mechanics of Materials, Plasticity, Testing Materials, Fatigue, Stress Measurement, Mechanical Processing, Machine Tools, Refrigeration, Air Conditioning, Sloan Automotive and Aircraft Engines, and Gas Turbines.

In the afternoon of the same day, the Committee discussed with members of the Department and with representatives of the administration the postwar plans for modernization and expansion of certain laboratories, the introduction of new subjects of instruction, additions to the staff, and the relation between the undergraduate and graduate curricula.

The Committee fully approves the Department's plans for its future development and, within the limit of funds available, recommends full support for the modernization of the Mechanical Processing and Machine Tool laboratories. The housing of these two laboratories in the same building is desirable. The Committee recommends the development of these laboratories toward offering instruction, not only in the mechanics of machine tools and of the welding, forging, forming, and casting operations involved in manufacturing, but also in the physical and metallurgical effects of such operations, including metal cutting. There appears to be an opportunity to unify the concepts involved in altering the shape of metal by utilization of basic ideas both from mechanics and from metallurgy. To this end, closer co-operation with the Department of Metallurgy is recommended. Eventually, work of graduate school level should be offered.*

It is understood that both the Department of Aeronautical Engineering and the Department of Naval Architecture and Marine Engineering are interested in having

(*Concluded on page 288*)

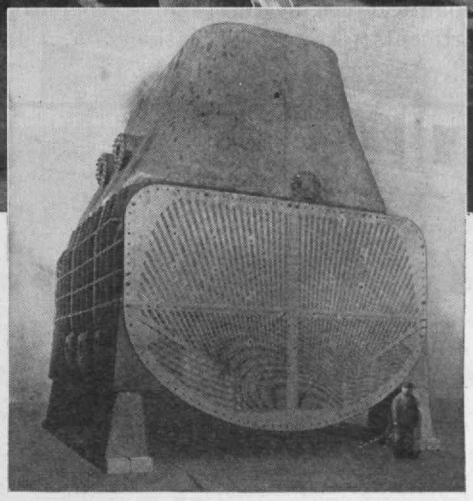
* Members of the Committee for 1945–1946 were: B. Edwin Hutchinson, '09, chairman, Norman D. MacLeod, '14, George J. Mead, '16, Charles A. Chayne, '19, William H. Collins, Kenneth H. Condit, and Ralph E. Flanders.

* The recent establishment of the Mechanical Metallurgy Laboratory under the directorship of Professor John Wulff of the Department of Metallurgy fulfills this recommendation.

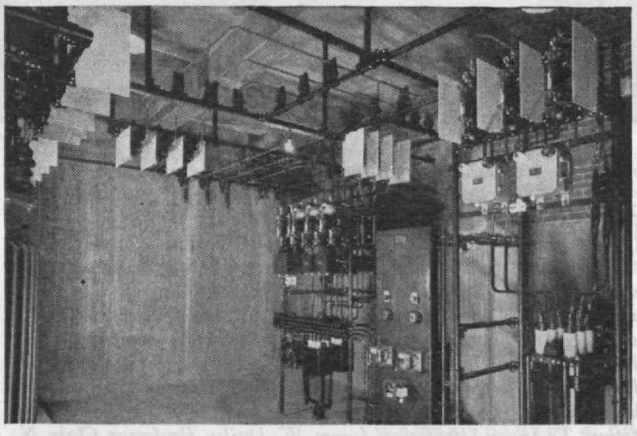
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THE INSTITUTE GAZETTE

(*Concluded from page 286*)

their students obtain better instruction in the performance of modern machine tools. To improve the instruction given, it will be necessary to replace old tools by modern types of greater power and rigidity. This is being done by acquisition of war surplus machinery from the government.

It is recommended that the instruction eventually be developed to include the principles of jigs and fixtures and the action of the cutting edge. Also within the limits of available funds the Committee recommends the modernization and enlargement of the Sloan Laboratories for Aircraft and Automotive Engines. The generous support of Alfred P. Sloan, Jr., '95, has made possible timely alterations to permit a larger number of students to take advantage of this unique facility. The Committee believes that automotive engineering is a most important branch of mechanical engineering and that the Institute's instruction and research in this field should continue to be kept in a leading position.*

The Committee notes with satisfaction that the Visiting Committee on the Department of Aeronautical Engineering succeeded in raising funds from industry to provide a Gas Turbine Laboratory, to be used jointly by the Aeronautical Engineering and Mechanical Engineering departments for graduate instruction. The Committee also notes with approval that additional staff members have been engaged.

*This modernization is now being carried out.

The Committee suggests that consideration be given to the use of visual aids in teaching, such as have been found helpful in Army and Navy war training courses. Visual aids, such as models, slide films, moving pictures, and animated drawings might prove useful for presentation of information and descriptive matter to large classes and for illustration of processes.

The Committee devoted considerable time to a consideration of the objectives of the Course in Mechanical Engineering. It recommends that continuing efforts be made to attract superior students to the Graduate School by the offer of special opportunities for instruction and research, by scholarship aid, and above all by having teachers of outstanding ability. It further recommends that steps be taken to control the number of seniors so that adequate laboratory facilities are available for graduate students.

The Committee heartily endorses the Department's plan for splitting the senior curriculum into two options: the General option, emphasizing practice, for those students who intend to go directly into industry; and the Engineering Science option, emphasizing analysis, for those who show an aptitude for advanced study leading to design and research.

The Committee is gratified that its previous suggestion regarding instruction in production has resulted in an elective course in the Department of Business and Engineering Administration available to Mechanical Engineering seniors and others.



Photo by Empire

The annual meeting of the American Society of Civil Engineers provided opportunity for Technology Alumni in the civil engineering profession to get together for an informal luncheon at the Hotel Commodore on January 16, 1947. The luncheon, arranged by the Technology Club of New York, was attended by 92 engineers, educators, and executives. Seated (left to right) at the head table near the far wall are: George E. Barnes, '23, Head of the Department of Civil Engineering at the Case School of Applied Science; Rear Admiral William H. Smith, '15, chief of the design section, Bureau of Yards and Docks, United States Navy; John B. Wilbur, '26, Head of the Department of Civil Engineering at M.I.T.; William H. Mueser, '22, partner, Moran, Proctor, Freeman, and Mueser, and Vice-president of the Technology Club of New York; Charles B. Breed, '97, former Head of the Department of Civil Engineering at M.I.T.; Allan R. Cullimore, '07, President, Newark College of Engineering; William E. Stanley, Professor of Sanitary Engineering at M.I.T.; Hale Sutherland, '10, Head of the Department of Civil Engineering at Lehigh University; C. George Dandrow, '22, Vice-president, Johns-Manville Corporation, President of the Technology Club of New York, and Vice-president of the M.I.T. Alumni Association; Alfred T. Glassett, '20, Vice-president, W. J. Barney Corporation. Members of the instructing staff of the Department of Civil Engineering who attended the luncheon are (in addition to those at the head table): Thomas W. Lambe, 2-44, Professor Donald W. Tyler, '34, Professor Arthur T. Ippen, Professor James W. Daily, Professor Clair N. Sawyer, and Professor John B. Babcock, 3d., '10. Also present and active in M.I.T. activities were Walter D. Binger, '16, Vice-president, City Investment Company, and member of the Visiting Committee on Civil Engineering; William H. Latham, '26, Park Engineer, City of New York; and Arthur L. Shaw, '09, partner, Metcalf and Eddy, and contact member of the student chapter of the American Society of Civil Engineers.

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PISCATORIAL CONCERTO

(*Continued from page 272*)

and Development, called the conference of April 1 to decide the direction in which further research on underwater background noise should proceed. Some four dozen specialists in acoustics, representing various Navy laboratories as well as industrial and academic groups working under O.S.R.D. contracts, participated in the conference. The approach finally agreed upon was indirect but logical. It was to study fish noises in accessible areas where oceanographic and biological conditions were similar to those which obtained in more active waters. In order to put the results to greatest use, it was decided that, by experiments on segregated fish, a further effort should be made to identify various biological noises picked up in open water. Commander Charles J. Fish, an oceanographer and marine biologist attached to the Navy, recommended the waters of Florida and the Bahamas for further listening studies since these correspond most closely in marine life to the coral reef areas near the Japanese Islands.

War Work in an Aquarium

As a result of the conference, the Navy assigned the studies on segregated fish to the Naval Ordnance Laboratory, and the measurement of the noise off Florida was made a joint project for the San Diego laboratory, the New London laboratory, and the Naval Ordnance Laboratory. Segregation work was pursued at the Shedd Aquarium in Chicago and also at the United States Fishery Biological Laboratory at Beaufort, N. C. For the studies in the Gulf Stream, the Navy used a 90-foot yawl, the *Odyssey*, painted it gray, and renamed it the U.S.S. *Saluda*.

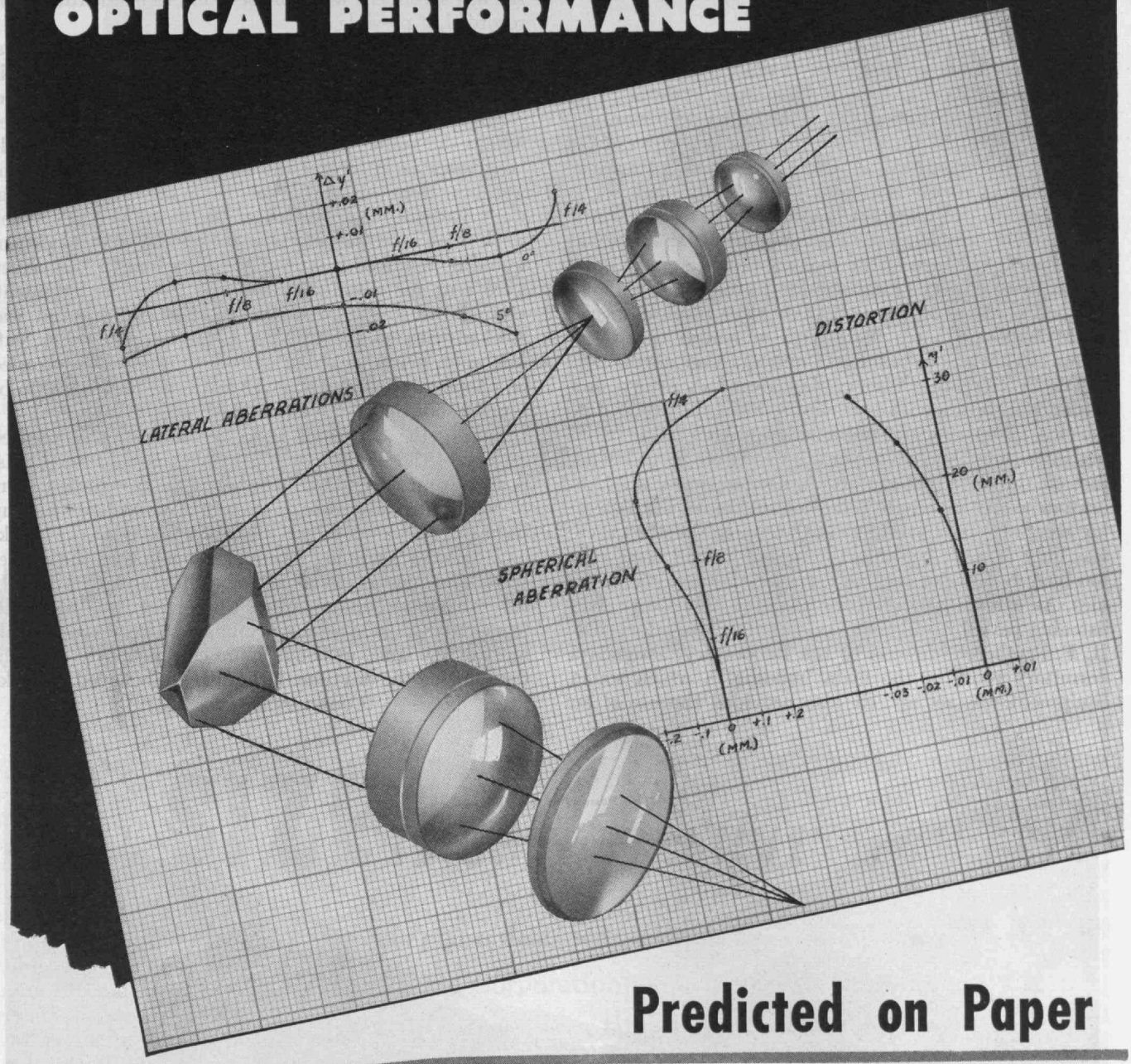
By a long distance telephone call to Walter Chute, enterprising director of the Shedd Aquarium in Chicago, arrangements were made to listen to fish there with equipment from the Naval Ordnance Laboratory. His promise to give all the help he possibly could was no idle indulgence in rhetoric. When Naval Ordnance Laboratory representatives arrived in Chicago with sound recording equipment, he put his men to work opening the crates and helping to install 800 pounds of apparatus. Meters, amplifiers, and a disc recorder were set up on two tiers of a movable table, which could be rolled with ease down the corridors behind the exhibition tanks. By suspending the hydrophone into each tank and listening to the sounds from a speaker, it was found that about half the marine species in the aquarium would make noises, either spontaneously or when induced by proper stimuli. Some, such as the triggerfish and sting ray, would make a noise only while eating, at which time crunching sounds from the speakers would resound throughout the aquarium's rear galleries. Other species, such as the red drums and croakers, would sound off only when frightened with a net. The old 300-pound black drum, a resident of the aquarium since 1930, would give out his characteristic boom only when nudged with a mop.

Piscatorial Concert "At Home"

All through our experiments, Mr. Chute would watch us work and listen to his fish perform over our speaker. He was genuinely gratified that the Shedd Aquarium had

(*Continued on page 292*)

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PISCATORIAL CONCERTO

(*Continued from page 290*)

been selected for this research program. It was difficult, he said, for an aquarium director to feel very useful when a war was going on, and this collaboration with the Navy provided a rare opportunity to make a direct contribution.

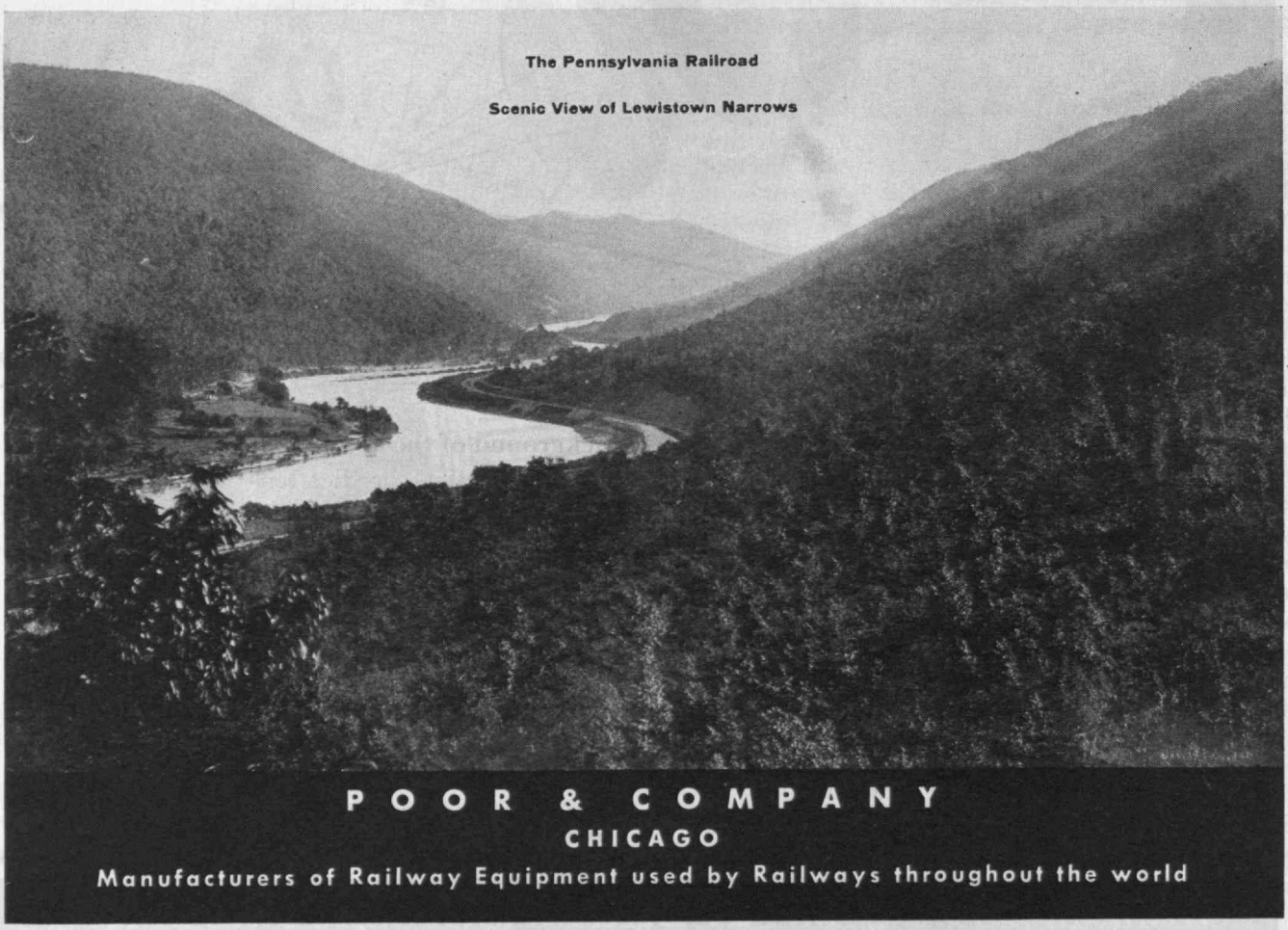
At Beaufort, N. C., where work was in progress from June to August, 1943, an effort was made to arrange conditions in such a way that the fish, although segregated, would feel more "at home" than in an aquarium. The Government had established a marine laboratory at Beaufort at the turn of the century because of the great density and variety of aquatic life in the shallow, bank-protected waters of Bogue Sound. Most tropical species could be found here, along with numerous cold-water forms having a normal habitat much farther north.

The United States Fishery Biological Laboratory, now under the Interior Department's Fish and Wild Life Service, occupies an old-fashioned, rambling frame building surrounded by groves of yucca trees on Piver Island, just off the town of Beaufort. In normal times, the Laboratory would have been full of marine biologists dissecting sting rays or sharks, but in the summer of 1943 there was only a small handful, the others having been kept too busy because of accelerated wartime teaching schedules. As a result, the Naval Ordnance Laboratory fish-listening party was almost alone at the Laboratory. Dr. H. F. Prytherch, director of the Laboratory, assigned a dormitory room in the main building in which sound equipment was set up. He also provided the use of an abandoned mullet pond about 1,000 feet away to house the fish specimens whose noises were to be identified and recorded, if possible.

After considerable difficulty, two local commercial fishermen with a boat were hired to bring in, alive and in good condition, stocks of fish for the experiments and recordings. Using chicken wire, four areas were enclosed within the mullet pond so that a different species would be segregated in each of the enclosures. The hydrophone was hung from the side of each pen in turn, and recordings were made of whatever noises the catch yielded. When work with one species was completed the specimens would be removed from the enclosure and the fishermen were sent for a different type of fish as replacement. During the course of this work, the mullet pond was stocked with croakers, toadfish, hogfish, sea robin, catfish, spot, perch, and black drum. Noises were recorded on phonograph discs whenever a species turned out to be sound producing.

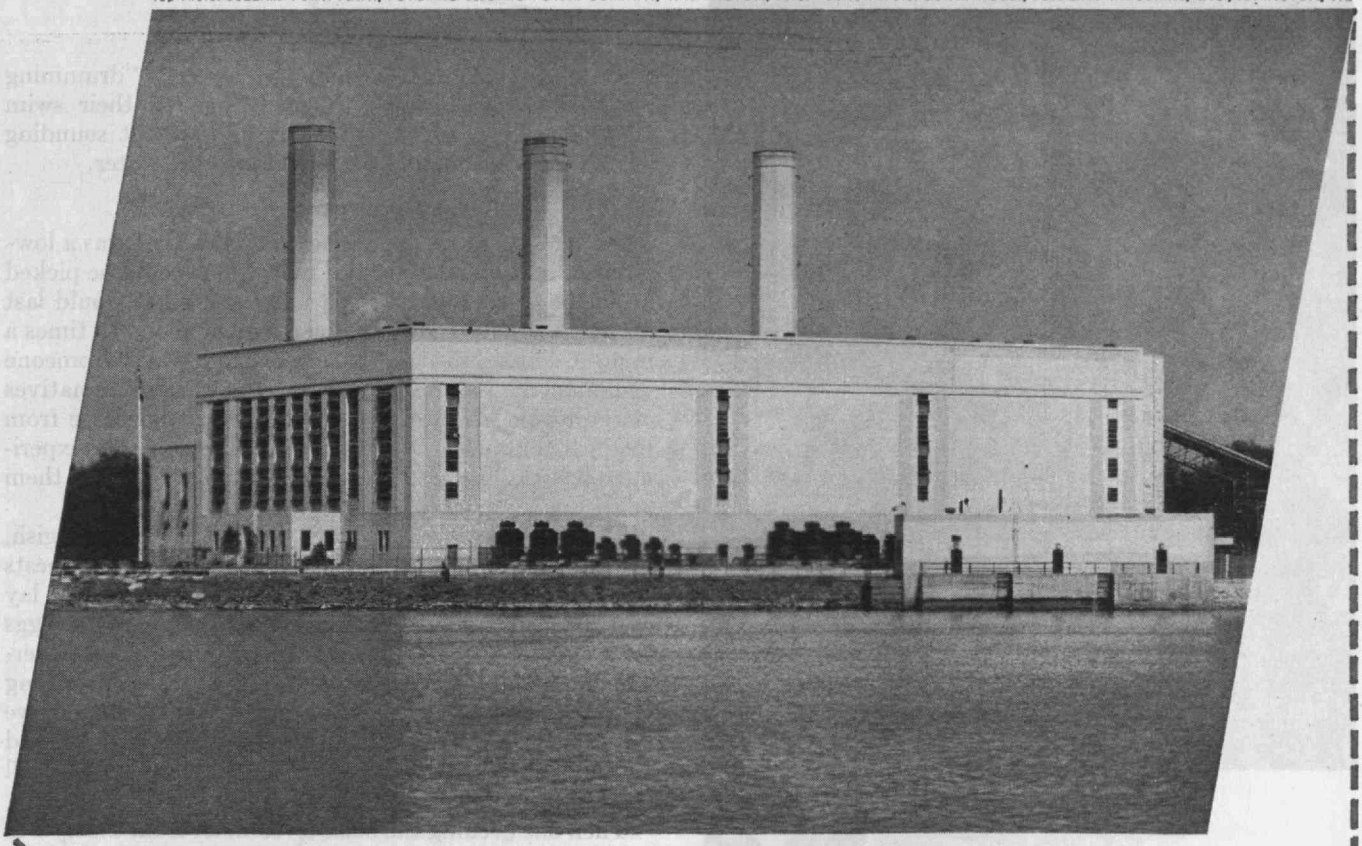
During the course of these recordings in segregated regions of the mullet pond, a hydrophone was kept suspended from the end of a pier below the instrument room to record any interesting noises that could be picked up from Bogue Sound. Invariably one could hear the crackling noise of snapping shrimp, which found the oyster shells and mud of the shallow bottom an exceptionally favorable environment. Then there were the drum rolls from croakers and other drumfish which were audible most of the time, although more conspicuously at night than during the daytime. Drumfish are believed to make

(*Continued on page 294*)



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PISCATORIAL CONCERTO

(*Continued from page 292*)

their machine-gun like noise by special "drumming muscles" which beat rhythmically against their swim bladders and which probably act as resonant sounding boards for transmitting the sound into the water.

Unco-operative Stentor

Strangest of all the noises heard at Beaufort was a low-pitched, intermittent musical toot, which could be picked up in the water almost any time. Each burst would last for half a second and would be repeated about 15 times a minute. This noise was often audible in the air to someone standing on a pier projecting over the water. The natives of the region always insisted that the sound came from toadfish, but when toadfish were placed in the experimental enclosures in the mullet pond no sound from them at all was ever heard.

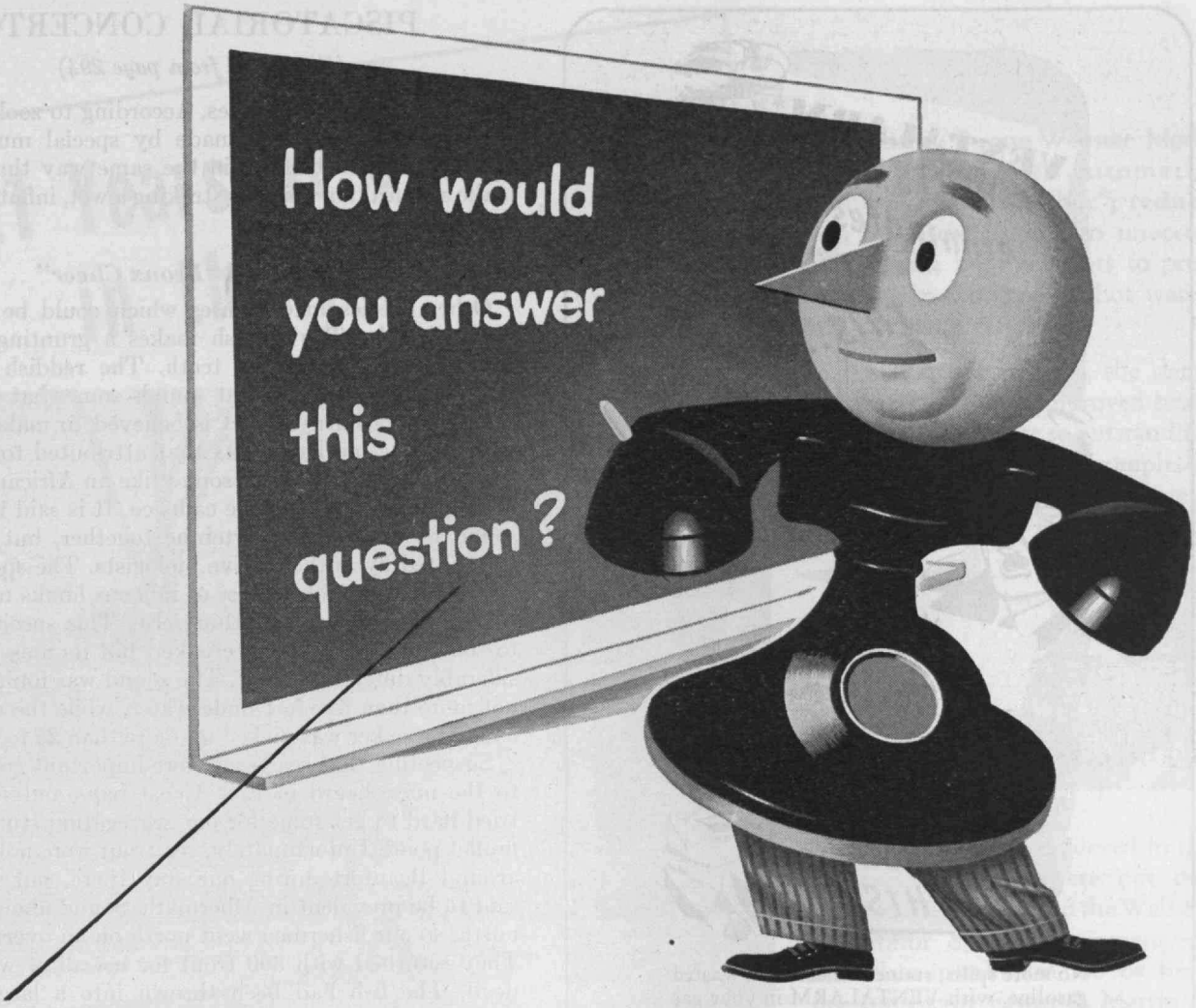
Toadfish are queer in many ways. They are sluggish, ill-tempered, repulsive looking creatures who build nests under rocks or in pieces of pipe on the bottom and lay eggs in them. The male toadfish is said to guard the eggs for a week or two at a time and, according to local fishermen, makes his characteristic noise as a means of warning intruders to stay away. For more than a month we listened in vain to the toadfish cage in the mullet pond and finally decided that if toadfish made any noise at all they surely would not do so in captivity.

Then one evening the noise level meter from the hydrophone on the pier swung far off scale every time the musical toot was heard over the loud-speaker. This indicated that the source of the noise was much closer to the hydrophone than it had ever been before. The next day the noise was just as loud, indicating that, whatever it was, the source had probably not moved during the night. The hydrophone was unfastened from its mooring on the pier and was moved around in the water until it was closest to the sound source as indicated by maximum reading of the sound level meter. A diving helmet was borrowed from the nearby Duke University Marine Laboratory, a boy was engaged to operate the pump, and the bottom, 12-feet deep at the point where the hydrophone indicated the source of the noise to be, was explored. But the water was too murky to permit anything at all to be seen; in this case the direct approach was doomed to failure.

Finally, after the noise had continued to come, apparently, from the same spot for a week, a new technique of identification was tried. A crab trap, baited with dead fish, was lowered from the end of the pier over the point where the noise was loudest. It was down only a minute or so when the noise stopped coming over the loud-speaker. When the crab trap was pulled up, a fat, sullen looking toadfish was inside. It was kept in the experimental pond for days and although the subject of frequent listening observations, never again produced musical toots. However, no longer did the loud tooting noise come from the spot under the pier.

The toadfish noise, if we may call it such, on the basis of so circumstantial an identification, had a tremendous volume — one that was much higher than that registered from any other species studied. It seems highly probable that the male toadfish could well guard his eggs by simply frightening any intruding outsiders with the very high

(*Continued on page 296*)



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PISCATORIAL CONCERTO

(*Continued from page 294*)

sound pressure he generates. According to zoologists, the steam whistle sound is made by special muscles that stroke the swim bladder in the same way that one can make a squeaking noise by stroking a wet, inflated balloon with one's finger.

Unexpected "Bronx Cheer"

Other species made noises which could be identified more directly. The hogfish makes a grunting noise by gnashing his pharyngeal teeth. The reddish color sea robin * makes a noise that sounds somewhat like a hen cackling in a barnyard. It is believed to make its noise by the same mechanism as that attributed to the toadfish. The catfish makes a sound like an African tom-tom beat, with about the same cadence. It is said to produce sound by beating its vertebrae together, but this view is doubted by authoritative biologists. The spot made a sound consisting of a series of raucous honks more like a "Bronx cheer" than anything else. This species belongs to the same family as the croaker, but its noise is of considerably different timbre. The sound was found to carry not more than five feet underwater, while the noise from a single croaker was picked up more than 25 feet away.

Suspecting that sea trout were important contributors to the noise heard in East Coast bays and sounds, we tried hard to get some for our segregation studies in the mullet pond. Unfortunately, sea trout were not in season around Beaufort during our stay there, but they were said to be prevalent in Albermarle Sound about 25 miles north, so our fishermen went north on an overnight trip. They returned with 300 trout for us, all of which were dead. The fish had been thrown into a large wooden tank through which, on the way home, the fishermen tried to circulate sea water, by pouring bucketsful in at the top and letting it out through a stopcock at the bottom. Although the men on this bucket brigade made a strenuous effort, they were not able to circulate the water in a manner pleasing to the trout, which popped to the surface, one by one, bellies up. We never did find out just what trout noises sound like.

After the segregation tests were completed, it was decided to record and measure the noises heard in the open sea outside of Beaufort Inlet. Local fishermen had spoken of an area off Cape Lookout where fish were especially plentiful and it seemed that it would be worth while to listen there. Accordingly, permission was obtained from the officer in charge of the nearby Morehead City Section Base, to take some listening and recording gear out on an 83-foot Coast Guard patrol vessel. Two overnight trips were made: one to Cape Lookout Light and the other to a fishing ground about 25 miles offshore.

At this time, Gene Irish, a woman physicist from the Naval Ordnance Laboratory, was helping with the fish noise work. Because of a Navy regulation forbidding women to be on any naval vessel when it is under way, she was not allowed to go out with the 83-footer. Much to the surprise of the crew, however, permission was obtained for her to board the boat before it left and help in setting up the apparatus. Because no more suitable space

(*Continued on page 298*)

* The word robin is akin to an old high German word meaning bright and is applied to numerous birds and flowers as well as to fish.

21 Years of Comfort in the Adirondacks



THE QUEENSBURY HOTEL, GLENS FALLS, N. Y.
Formerly the New Glens Falls Hotel. Built in 1925. Architect, J. G. White Engineering Corporation. Owner, Glens Falls Hotel Corporation. Heating Modernization program and installation of "control-by-the-weather" Webster Moderator System by Erwin C. Martin, Glens Falls heating contractor.

High in the Adirondacks, the Queensbury Hotel in historic Glens Falls, New York, cut fuel consumption $355 in one month, at the same time providing enhanced comfort for the hotel's guests.

Glens Falls, selected as "Hometown U.S.A." by Look Magazine in 1944, knows the Queensbury Hotel as a center of community life, where service clubs meet weekly and out-of-town celebrities frequently stay.

The Queensbury Hotel was built in 1925 and equipped with a Webster Vacuum System, including Webster Traps and Valves and a Nash Vacuum Pump, designed to provide all the heat necessary to meet severe Adirondack winters.

In 1944, the hotel owners decided upon a heating modernization program. This program included covering exposed risers to increase mild weather comfort and permit effective control; 2-zone Webster Moderator System with automatic "control-by-the-weather"; reduction in heating supply to unoccupied rooms; improvements to promote steam economy in hot water and kitchen services.

In less than six months, the demonstrated results in improved heating at lower cost were so outstanding that the hotel owners completed payment for the Moderator System for cash.



Earl S. Martin, Manager, Queensbury Hotel, Glens Falls, N. Y.

The heating results achieved in the Queensbury Hotel were not due alone to the changes and the Webster Moderator System Equipment — a first class installation job by heating contractor Erwin C. Martin of Glens Falls, competent operation by S. R. Bradley, Building Engineer, and cooperation in assuring effective use of the equipment by hotel personnel under the direction of Manager Earl S. Martin, were all equally vital.

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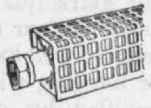
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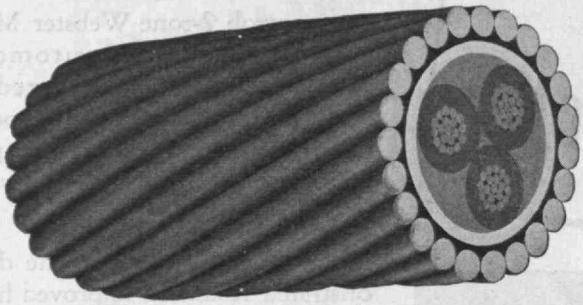


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PISCATORIAL CONCERTO

(*Continued from page 296*)

could be allotted for our equipment amplifiers and meters were installed on the bunk of the Chief Boatswain's Mate. Between meals, the disk recorder occupied the place of distinction on the mess table. The Chief slept in the fo'c'sle in an absent crewman's sack and was surprisingly cheerful about the inconvenience which the advancement of science made his lot. During an all night listening vigil, recordings were made whenever anything interesting could be heard.

Ultrasonic Shrimp

Early in the evening when we were at anchor over the fishing ground, a new kind of high pitched, drilling noise came over the loud-speaker. The noise resembled that of a croaker, but it had a much more metallic timbre and the drum rolls were spaced more closely. The noise increased in intensity as the evening wore on. It had not been heard in Bogue Sound, and only after observations were completed and a search of the literature could be made in Washington, was the noise circumstantially identified as coming from the bastard trout. This tiny fish, said to be common in the waters several miles off the Carolina Coast, is never found in the bays and sounds. Since the bastard trout is a member of the drumfish family, like the croaker, and since its noise had the high pitch that would be expected of a very small specimen, this identification, circumstantial as it was, appeared reasonable.

During the time the program at Beaufort was in full swing, the *Saluda* had been recording water noise at several dozen stations off the Florida Coast and in the Bahamas. When the original schedule had been completed, it was decided to extend the *Saluda's* program by a cruise up the East Coast to New London, Conn. One of our principal tasks on this cruise was to locate snapping shrimp which were believed to be somewhere along the North Carolina Coast, and to determine the northern limit of their occurrence along the Atlantic Coast. Shrimp were discovered as far north as the neighborhood of Cape Hatteras, but not before the *Saluda* had blundered, fortunately without mishap, into an offshore mine field laid to create a safe "pocket" in which convoys could anchor at night. After having listened to the captive fish in the mullet pond at Beaufort, it was especially interesting to be able to identify various noises off Wimble Shoals as coming, for example, from spot or sea robins.

Anchoring and floating our hydrophones at four stations between Jacksonville and Norfolk, we made the distance in seven days, using wind power when we could and a small auxiliary at other times. There were 12 aboard: three officers, five sailors, and four civilians. Crossing the convoy lanes between Norfolk and Montauk Point on our way to New London, the civilians had the unusual experience of reinforcing the naval personnel in standing watch, maneuvering the sails, and handling the wheel.

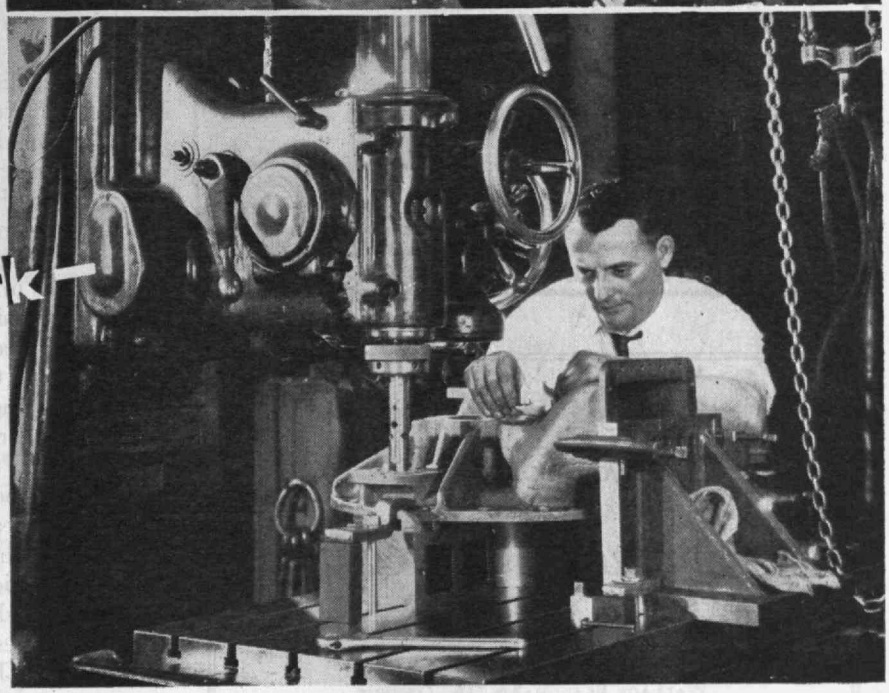
The New Izaak Walton

There will never be any way for us to know exactly how much noisy fish actually interfered with acoustic gear used under combat conditions. We know that off

(*Continued on page 300*)



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PISCATORIAL CONCERTO

(*Continued from page 298*)

Japan and other Pacific islands, our submarines took advantage of the crackling of shrimp, hiding under its cover to evade enemy echo-ranging equipment. Japanese mining officers, interrogated by American scientists on technical missions, reported spontaneous explosions in Tokyo Bay which were attributed to drumfish getting too vociferous around acoustic mines we had laid in the Bay. We now know that the Japanese themselves had a great deal of difficulty with spurious noises in their own sound equipment. It took them more than a year to track the source of the interference to noisy fish, and when their biologists began a systematic study of the subject in 1944 they were bombed out of every experimental station they had established for the purpose.

Now that the war is over, we may well ask whether the wartime work the Navy did on fish noise is likely to have any useful peacetime application. Although the full extent of civilian uses may require extended development over a long period, two possible uses are immediately evident; a scientific application and a commercial one. Techniques and equipment developed by the Navy can be employed as tools for marine biologists to study the population, distribution, movements, migrations, and behavior characteristics of soniferous fish species. The United States Fish and Wild Life Service, as well as the biological surveys of states along the seacoast, spend millions of dollars each year to investigate such matters. A few thousand dollars invested in underwater sound equipment might well lead to substantial returns in advancing this important study.

More extensive are the possibilities of using the noise made by fish as an aid in catching them commercially. In deep water trawling operations, for example, it would be extremely helpful to the fishermen if they could have something more reliable than "a hunch" to tell them where to lower their nets. Sound-producing fish generally travel in schools which announce their presence only by acoustic means.

At its present stage, however, it is not likely that the submarine sonic technique would be entirely practical for commercial fishing. A very important consideration is that all species of value as food are not noisemakers; north of New Jersey almost none makes noise. Thus the

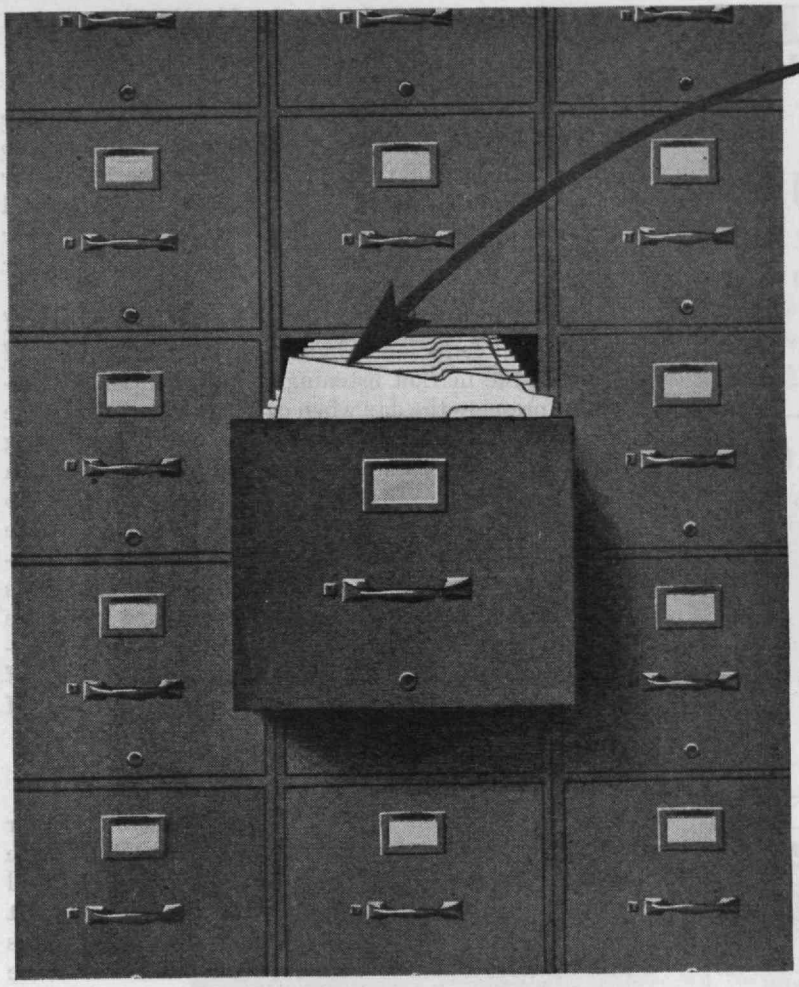
(*Concluded on page 302*)

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(*Concluded from page 300*)

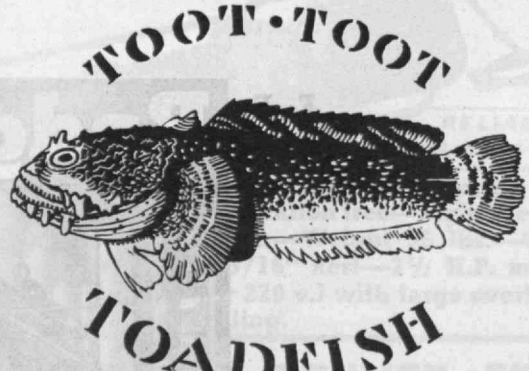
absence of sound would not necessarily imply the absence of food fish. Many soniferous species have a tendency to sound off only at night and this is not the best time for most fishing operations. Finally, it must be recognized that the necessary equipment might be too expensive for the average commercial fisherman and too difficult for him to operate effectively.

In spite of these difficulties, several manufacturers of marine equipment have indicated their intention of putting on the market listening kits for fishermen. Perhaps this presages the day when every fisherman will have to be a sound engineer or physicist, in addition to being a navigator and weather prophet. Fishing would then become so complex that if Izaak Walton returned to earth he would, as an exponent of the simple life, have nothing more to do with it. Whether fishing by hydrophone will ever supersede fishing by "hunch" depends mainly, however, on which can be proved to yield the largest catch. If listening for fish turns out to be an effective way of bringing them in, the day may not be far off when a hydrophone becomes as much an integral part of the equipment of a fishing boat as its anchor or net.

Acknowledgments

The Navy's investigation of biological underwater noises was, as has been pointed out, carried on by a large number of engineers, physicists, and biologists associated with several different war research activities. It is not possible to name them all here, but certain individuals whose contribution was outstanding should at least be mentioned. Measurements at the San Diego laboratory were undertaken by its Listening Section, with F. A. Everest in charge. The biological work there was done by Dr. Martin Johnson. Investigations in this field at the New London laboratory were under the direction of Donald Loye, assisted by Don A. Proudfood and Robert Wagner.

The measurements made by the Naval Ordnance Laboratory on fish noise off Cape Henry were conducted by L. C. Bell, George Brown, and Lee Swart. Wayland Loomis participated in the Shedd Aquarium work and that on the U. S. S. *Saluda*. Robert Grunwald took part in the work at Beaufort. Others are named in the body of the article. It should be borne in mind that all of the work here described was, as almost all war research, not a matter of individual effort but of considerable teamwork, where the ship's cook was, for example, as important a contributor as the scientist in charge of the party.



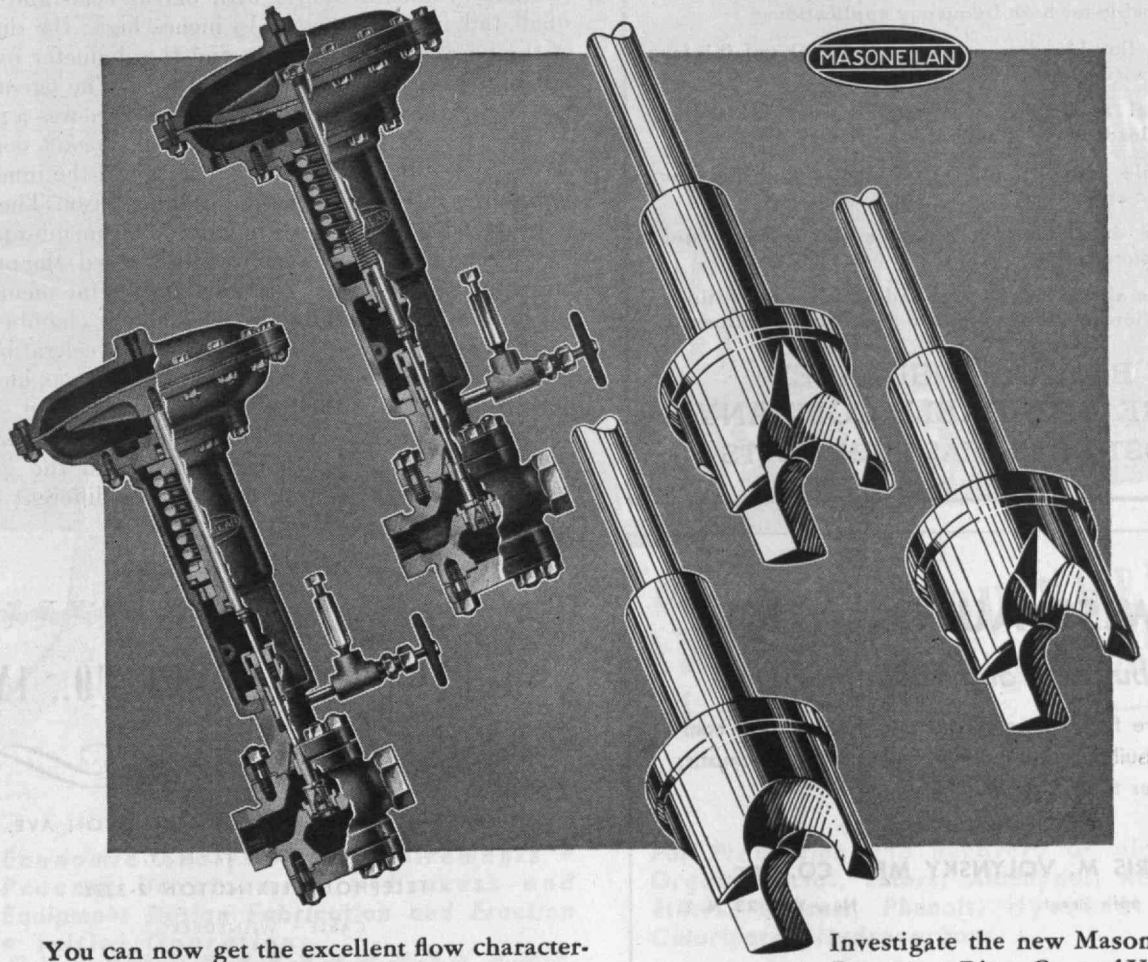
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TOO FEW, TOO LATE

(*Continued from page 282*)

and the rocket motor. The control surfaces were attached to the bottom end of the four-tail stabilizer fins.

The *Waterfall* rose vertically, but it is doubtful whether this rocket was actually used. Records of some four dozen experimental launchings have been found, but since these records also stated that the rocket was a "full success" in only 12 cases, obviously much development work had still to be done.

A very interesting weapon was the rocket *Taifun* (*Typhoon*) which was meant for antiaircraft barrage fire, a counterpart of the British Z-guns. The *Typhoon* had a straight cylindrical body, with ogival head and rather small tail fins. It stood 75½ inches high; the diameter of the body was four inches; and the diameter over the tail fins was eight and one-half inches. The ogival head was the warhead. Below the warhead there was a pressed cordite charge. The main body of the rocket consisted of the fuel tanks in two concentric tubes; the inner tube containing nitric acid, the outer tube, Visol. The tanks were closed not by valves but by metal membranes. To fire the *Typhoon* the cordite was discharged, the pressure built up by the charge ruptured the metal membranes and forced the fuels into the combustion chamber. The *Typhoon* was designed for very high acceleration; the take-off acceleration amounted to 31 *g* and was increased to 45 *g* by the time the fuel had been consumed.

The series of rockets code-named *Enzian* (*Gentian*) was also meant for antiaircraft fire from the ground. These rockets (there were four or five different types)

(*Concluded on page 306*)

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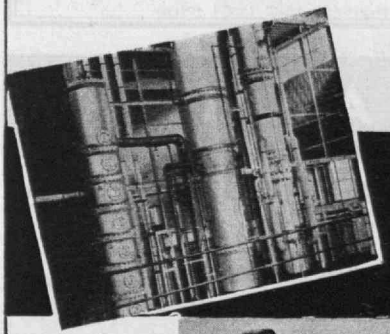


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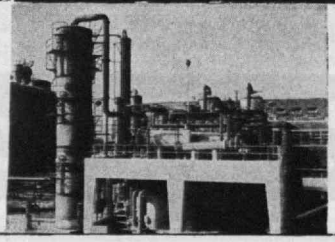
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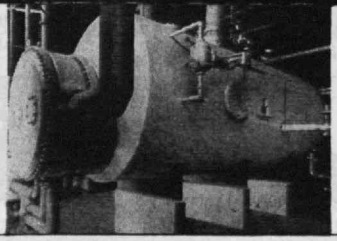


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TOO FEW, TOO LATE

(*Concluded from page 304*)

were also liquid fuel rockets, with solid fuel take-off booster. As rockets go, the *Gentian* was short and squat, with a diameter of three feet for a total length of 12.3 feet, weighing nearly 4,000 pounds at take-off. The high-explosive charge which it carried weighed 660 pounds. Unlike the *Typhoon*, the *Gentian* was intended to be a guided missile with radio control. None of the 24 rockets launched by January, 1945, was remotely controlled and only nine of the 24 were successful.

But the most fantastic of all German rocket devices was the one developed by Borsig-Rheinmetall. Since it was to be used in the Rhineland for aircraft interception, it was named *Rheintochter* (*Rhinemaiden*) or R-1. The *Rheintochter* was launched from an inclined ramp, and, to say the least, presented an extraordinary appearance. For the first two kilometers of its flight, the R-1 was carried by a booster unit, 22 inches in diameter and 58½ inches long. The end of the booster unit was covered with six rocket exhaust nozzles while four large slanting wings of mixed wood and metal construction projected from the booster unit in a cruciform pattern. The main rocket, only 20 inches in diameter and 11 feet, 10½ inches long, had four rather large wooden guiding fins near the nose and six long slanting wings, jutting out in a hexagonal pattern. Six rocket exhausts slanted out of the body between these wings, the only place left for them since the bottom of the main rocket, the section to which the booster unit was connected, was the bomb. The warhead was carried in the tail for a change.

Again counting from the nose or head, the arrangement of the parts was as follows: The nose contained a proximity fuse called *Kugelblitz* ("ball lightning") followed by four wooden control fins on the outside and their controlling motors on the inside. The next section contained the gyroscopes, followed by the compartment housing the radio receiver. Next came the fuel compartment and the six rocket exhausts, grouped between the six wings. The bottom compartment of the main rocket was the high-explosive charge. A guide flare was attached to its housing from the outside.

The multiplicity of fins and wings is somewhat hard to explain. Even when equipped with stabilizing fins, rockets have a tendency to rotate slowly. The numerous fins may have been intended to prevent, at all costs, a rotation of the rocket along its longitudinal axis. Another possible reason for the six long wings may have been to provide some lifting power by one pair of wings during horizontal, or near horizontal, movement, no matter in which position the rocket happened to be when the need for such movement arose. Most likely both of these purposes were in the minds of the designers when they put such an array of bristling wings and fins on the rocket.

The *Rhinemaiden* was to be guided from the ground by means of two correlated radar plots, one on the *Rhinemaiden* and one on the bomber to be destroyed.

None of all these weapons seems to have been used in combat by the Germans. Had the Nazis been given time to continue their work on these developments, one or more of these rockets may have turned out to be a rather effective weapon.

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A CENTURY OF SLEEP

(*Continued from page 280*)

In December, 1844, Horace Wells of Hartford, Conn., used nitrous oxide to produce anesthesia for tooth extraction, and during 1845 used ether once and nitrous oxide several times for the same purpose. Wells gave such information as he had to Morton with whom he had a brief partnership. When all is said the credit due Morton is not that of a discoverer but that of being the first to convince the world of the truth of the discovery. Wells made an attempt to promote the use of nitrous oxide, demonstrated it to Morton in Boston. In January, 1845, John Collins Warren permitted Wells to administer the gas to a boy for a tooth extraction before a class at the Harvard Medical School. Not enough gas was administered so that the boy screamed out in pain. Upon failure of this demonstration, the discouraged Wells returned to his home and abandoned his dental practice. Later, he went to Paris where he met little enthusiasm and was judged by many to be an impostor. Finally, after other experiences of frustration, he committed suicide in January, 1848.

The articles and papers of Long and Wells are listed and discussed in the *Annotated Catalogue*. So also are many of the ephemeral publications which relate to the Morton-Jackson controversy and other books and documents covering the whole history of anesthesia. The history of anesthesia is traced from the sleeping potions of the ancients, made from mandragora (or mandrake which we now know contains alkaloids of the scopolamine group), to opium, alcoholic intoxication, chilling the part with snow and ice-cold water (as was done by Avicenna early in the Eleventh Century and by the Russian surgeons of World War II), to carbon dioxide and to mesmerism, and on down to and including the establishment of chloroform and ether in general surgical practice. Regional and block anesthesia, and studies on individual anesthetics are more recent subjects reserved for Part II of the *Catalogue*.

Victory over Pain: A History of Anesthesia by Victor Robinson†† is a thoroughly scholarly work, with a selected and annotated bibliography and a useful index, attractively printed and illustrated, designed to be read. It is such a book as a book reviewer will read completely.

In 1920 Dr. Robinson founded *Medical Life*, the first monthly journal of medical history in the English language. Later the position of professor of the history of medicine in the Temple University Medical School was created for him — a position which he still occupies. His book treats very fully of the history of anesthesia and broadly of its cultural connections and implications. Starting with the drugs of the ancients — hellebore, dittany, opium, mandrake, lettuce, hemlock, henbane, mulberry, and hops — it follows the fight against pain in Europe as well as in America, and points out certain of its relationships to the fight against infection. It discusses improvements in obstetrics, the rise of aseptic and antiseptic surgery, and paints a realistic picture of the effects of pain, quoting in extenso from a letter describing his own experiences and reactions which "An Old Patient" (George Wilson) sent anonymously to Simpson of Edinburgh. The book supplies an easy and

(*Concluded on page 310*)

†† New York: Henry Schuman, 1946. xiv + 338 pages. $3.50.



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A CENTURY OF SLEEP

(*Concluded from page 308*)

agreeable way to orient oneself with respect to the new anesthetics, twilight sleep, continuous caudal analgesia, endotracheal, rectal, intravenous, spinal, and refrigeration anesthetics, ethylene, cyclopropane, divinyl ether, and curare. "At the present writing," says Robinson, "it is too early for curare to have a place in the textbooks of anesthesia, but it will be included in future editions. Curare, the horror drug of the forest, has been tamed by science and turned into a messenger of mercy." The story however is not wholly a triumphant one. Starting on the high note of victory over pain, it terminates with the tragic problems created by anesthesia itself:

> Death haunts the dental chairs and operating-rooms of America. Every year thousands of Americans needlessly die from preventable asphyxial accidents, a sad commentary after one hundred years of surgical anesthesia in the land of its birth.
>
> Continual training is needed by the doctors, dentists, nurses and technicians who bring the patient to the gates of sleep through anesthesia. Eternal vigilance is the price of safety in anesthesia. The ancient legend of Sleep as the twin-brother of Death gains a new meaning in the slumber of Anesthesia.
>
> Yet the portents are bright for the future. The days are past when anesthesia can be regarded as a mechanical and subsidiary adjunct of surgery, to be administered by hands that can be spared from other duties. The first centennial of anesthesia finds it emerging as a youthful and vigorous specialty.

This word of warning may well be proffered, particularly in these times when the number of properly trained medical personnel is sorely inadequate to meet current needs. Still, the scales are tremendously unbalanced in favor of the benefits which have come to mankind through the work of pioneers in anesthesia. Such must be the consensus of any review of a century of sleep.

NIGHT AERIAL PHOTOGRAPHY

(*Concluded from page 278*)

This article should not give the reader the impression that night photography and navigation are perfected developments. The present systems are not capable of accomplishing assigned missions as encountered in military situations except in favorable instances. The fundamental problems remain only partially solved. More development and experimentation are necessary, and are now in progress, to carry the methods to greater achievement. Perhaps perfect performance may never be attained.

Even the small success attained thus far would never have been possible were it not for the personal interest and co-operation given to the job by not only those directly engaged in the work here at M.I.T., but by the many persons in the services and in numerous industrial companies who gave unstintingly of their time and effort.

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LESLIE A. JACKSON '09, Manager, Little Rock Municipal Water System, Little Rock

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EDWARD J. RILEY '09, Graybar Electric Company, Inc., Ninth and Howard Streets, San Francisco
FORD W. SAMMIS '28, 433 South Spring Street, Los Angeles 13

COLORADO
ALFRED E. PERLMAN '23, Denver and Rio Grande Western Railroad Company, Denver 1

CONNECTICUT
FREDERICK W. GREEN '32, Nash Engineering Company, Wilson Avenue, South Norwalk (Bridgeport area)
GEORGE L. MYLCHREEST '10, 238 Palm Street, Hartford
CHARLES E. SMITH '00, Railroad Office Building, New Haven

DISTRICT OF COLUMBIA
WILLIAM C. MEHAFFEY '17, 1630 North Greenbrier Street, Arlington, Virginia

FLORIDA
GEORGE W. SIMONS '15, Hildebrandt Building, Jacksonville
CLARENCE P. THAYER '23, 4212 N. W. Sixth Avenue, Miami
FRANKLIN O. ADAMS '07, 305 Morgan Street, Tampa

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ALBERT D. KING '32, De Bell and Richardson, 3 Post Office Alley, Springfield

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ADAM K. STRICKER '29, 1227 Bishop Road, Grosse Point Park, Detroit

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LELAND CLAPPER '09, 5600 London Road, Duluth
CHARLES W. DREW '19, Minneapolis-Honeywell Regulator Company, Minneapolis

MISSOURI
HARRY L. HAVENS '09, Havens Structural Steel Company, 1713 Crystal, Kansas City
WESLEY W. WEDEMEYER '30, Wedemeyer and Hecker, Architects, 319 North Fourth Street, St. Louis 2

MONTANA
WALTER R. C. RUSSERT '18, Anaconda Copper Company, Butte

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JOHN M. HANLEY '30, Northern Natural Gas Company, Aquila Court Building, Omaha

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JOHN C. FRUIT '02, Equitable Life Assurance Society of U. S., 393 7th Avenue, New York 1
RAYMOND G. BROWN '16, Comstock and Westcott Inc., Niagara Falls
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Preliminary Report

The seventh year of the M.I.T. Alumni Fund comes to an end on March 31. A complete report will be mailed to all Alumni, as usual, sometime in May. However, it seems fitting that a preliminary report be made at this time, as evidence of the progress which has been made.

By the 17th of February 9,906 Alumni had contributed $172,281.04 to the 1946–1947 Fund. This figure, more than $20,000 in excess of last year at the same time, is most encouraging. It indicates a growing awareness of the importance to M.I.T. of this annual program of giving, a willingness to take an active part.

But this is by no means the whole story. Each year the Fund benefits by a refund from the unexpended Alumni Association budget of the previous year and by profits from the Technology Review. These two, in excess of $11,600 this year, bring our actual total to $184,000. In other words, our Fund is now $19,000 ahead of last year's final figure.

Particularly significant is the amount of the average contribution. At the end of the Fund's first year, the average was only $8.30. This year that figure has more than doubled. It now stands at $18.60. We, the Alumni of M.I.T., may well be proud of the manner in which we have responded to the needs of our Alma Mater.

TECHNOLOGY MEN IN ACTION

ALUMNI AND OFFICERS IN THE NEWS

Excelsior

¶ Frank A. Robbins, Jr., '02, made a member of the cabinet of the Governor of Pennsylvania, by his appointment as secretary of the State Department of Public Assistance.

¶ Samuel A Greeley '06, elected a director of the American Society of Civil Engineers.

¶ Howard D. Williams '11, named president and general manager of Erwin, Wasey and Company, New York.

¶ John N. Dalton '15, elected vice-president, and J. Robert Bonnar '27, chosen to head the executive committee on research, of the American Association of Textile Chemists and Colorists.

¶ Thomas W. Little '16, made a director of the State Street Trust Company in Boston.

¶ Ernest H. Huntress '20, elected for a three-year term as an associate editor of the Chemical Monograph Series of the American Chemical Society.

¶ Willard C. Asbury '25, elected a vice-president and director of the Standard Oil Development Company, in charge of contracts and patents.

¶ Cyril S. Smith '26, chosen a member of a committee which will advise the Atomic Energy Commission on technical aspects of materials, production, and research.

¶ Roland F. Beers '28, appointed chairman of the committee on geophysical sciences of the Joint Research and Development Board of the Army and Navy.

¶ James B. Fisk '31, selected by the Atomic Energy Commission to direct its division of research.

¶ Carroll L. Wilson '32, named general manager of the Atomic Energy Commission.

¶ William M. Hawkes '35, Commander, U.S.N., made squadron commander of the central group of aircraft for the Byrd antarctic expedition.

Platform Patter

¶ By William H. McAdams '17, at Purdue University on January 14 and 15, a series of three lectures on heat transmission.

¶ By Albert C. Walker '18, before the December 31st meeting of the Geological Society of America held at Harvard University, a discourse on "Growing Large Crystals of Ammonium Dihydrogen Phosphate."

¶ By Charles A. Thomas '24 and others, on January 30 in an Oak Ridge session of America's Town Meeting of the Air, a discussion of the question, "How Can Atomic Energy Be Used and Controlled?"

¶ By Parry H. Moon '27 and Domina E. Spencer '39, on January 17 before the New England section of the Illuminating Engineering Society, a lecture on "Quality in Lighting."

¶ By Hermon H. Scott '30, on January 14 before the Lynn section of the American Institute of Electrical Engineers, a discussion of "The Reduction of Background Noise in the Reproduction of Music from Records."

¶ By Jerry B. Minter, 2d, '34, before a meeting of the Radio Club of America held at Columbia University on January 10, a paper entitled "Measurements on FM Receivers."

¶ By Dugald C. Jackson, staff emeritus, on January 23 before the metropolitan chapter of the Massachusetts Society of Professional Engineers, a lecture on "Engineering Codes of Ethics and Practices."

¶ By Kurt S. Lion, staff, on January 14 before the Boston section of the American Institute of Electrical Engineers, a discussion of "Electricity in Medicine."

DEATHS

** Mentioned in class notes.*

¶ John F. Willard '76, November 24.
¶ Alfred O. Doane '84, December 17.
¶ Samuel M. Ilsley '84, December 27.
¶ Henry F. Eastman '88, December 7.
¶ George B. Prinz '88, November 29.*
¶ Herman Parker '89, April 3.*
¶ William B. Willim '89, Spring, 1946.*
¶ Burdett Moody '90, September 2.
¶ Cabot J. Morse '90, August 21.
¶ Ernest L. Libbey '91, December 26.*
¶ Charles P. Cogswell '92, September 12.*
¶ Allen French '92, October 6.
¶ Elmer G. Manahan '92, December 30.
¶ Warren E. Brooks '93, December 22.
¶ John W. Logan '93, January 28.
¶ Horatio N. Parker '94, December 22.
¶ Ira A. Nay '95, December 8.
¶ Charles B. Clark '97, February 24.*
¶ W. Edgar Reed '97, January 25.
¶ Harrison W. Smith '97, January 3.*
¶ David T. Whiton '97, October 29.*
¶ Earle C. Emery '98, October 31.*
¶ Winthrop R. Dodge '99, November 23, 1945.*
¶ Francis H. Pough '01, September 20.
¶ Orlando S. Stockman '01, December 6.*
¶ Theodore G. Miller '02, November 28.
¶ Henry S. B. Stimson '02, October 15.
¶ Chester S. Aldrich '03, November 2.
¶ Gerald F. Loughlin '03, October 22.*
¶ Paul A. Blair '05, December 22.
¶ Henry H. W. Keith '05, December 2.*
¶ Frank C. Stockwell '07, December 29.*
¶ Philip J. Hale '08, November 27.*
¶ Leland E. Wemple '08, January 3.*
¶ Albert S. Peet '09, January 6.
¶ Walter S. Rodman '09, December 31.
¶ Rafael A. Beckmann '11, December 24.*
¶ Oliver R. Hayes '13, October 28, 1945.*
¶ Alfred G. Ranney '13, May 27, 1944.*
¶ Orie L. Hall '15, November 29.
¶ Burkett D. Newton '16, July 28, 1945.
¶ Claudius M. Dickson '17, November 5.
¶ Harold D. Kilgore '18, December 9.*
¶ C. Hathaway Lovell '23, in June.
¶ Edison B. Middlekauf '23, December 6.*
¶ Morris Cohen '24, February 1, 1946.
¶ E. Kendall Bragg '26, December 26.*
¶ Walter Seligman '27, August 19, 1945.
¶ George H. Wardner, Jr., '30, January 5.*
¶ William W. Anderson, Jr., '31, September 2.
¶ Deborah Rubenstein Dauber '34, November 21.
¶ George J. Lovett, Jr., '35, November 12.
¶ I. Rupert Lewis '37, December 18.*
¶ Frederick E. Lykes, Jr., '42, November 29.*
¶ Burt C. McNall '42, November 10, 1942.*
¶ Elbert B. Pritchard '44, date unknown.*
¶ DeForest W. Meehleib '46, December 10.
¶ Kurt Lewin, staff, February 12.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M.I.T. Club of Albany

The Club held a dinner meeting in the Green Room of the Wellington Hotel on January 29, with 19 members present. We welcomed the return of L. R. Moses '29, who had spent four years in the armed forces of our country.

We had as our guest and speaker Dr. R. H. Flower, a paleontologist of the New York state geological staff, who gave an instructive and interesting talk with pictorial illustrations on the latest theories regarding the geological formation and growth of eastern New York State and the problems which confront the geologist as he attempts to read the history hidden in the rocks and other formations. — GEORGE W. SCHAIBLE '30, *Secretary*, New York Telephone Company, 158 State Street, Albany, N.Y.

M.I.T. Club of Chicago

On January 3, a group of 46 members and guests braved a heavy snowfall to attend the luncheon at the University Club. The advance reservations numbered 79, but the difficult road travel reduced this attendance. We were, however, more than repaid for our effort. President Steinwedell '25 introduced as the guest speaker the newly elected executive vice-president of the Alumni Association, H. E. Lobdell '17. This was Lobby's initial appearance before an Alumni Club in his new position.

In his easygoing manner, he proceeded with a very interesting informal résumé of recent happenings at the Institute. We learned of the increase in the student body to include all that the Institute can hold and the task of interviewing and taking into consideration the overwhelming number of applicants. We learned the business details of handling this greatly increased enrollment, the housing problems in the accommodation of the G.I. students, in general, the scope of instruction now under way, and the more recent duties assigned to him. We were brought up to date on what a good job the Institute is doing.

Bill Steinwedell announced that President Compton will be our next guest, on the evening of April 14. This promises to be a gala affair. Make your plans now to attend. — SIDNEY P. GRIFFIN '20, *Secretary*, Public Service Company of Northern Illinois, 72 West Adams Street, Chicago 3, Ill.

Indiana Association of the M.I.T.

On January 8, a dinner meeting was held at the Apex Grill. Twelve members and two guests were present.

At the business meeting after the dinner, reports of the meetings of both November 13 and December 13 were given. Y. S. Touloukian '41 of the mechanical engineering school of Purdue had sent us notices of a series of lectures by Professor W. H. McAdams '17 of M.I.T. on heat transfer. The notices were distributed to the members, so that any who desired might attend. A letter from member W. Stewart Roberts '32 suggested that a better meeting place be secured and that fewer and better meetings be held. Quite a discussion ensued regarding the present scene of our gatherings. It was pointed out that the food in several of the better clubs was of inferior quality and twice as expensive as that now being served us. Also it was remarked that it was difficult to get into many of the better clubs. On the other hand, attention was called to the fact that our present meeting place is quite noisy during the earlier part of the evening and the appearance of the room not very attractive. Everyone agreed that the food was very good and very reasonable in price. The dinner chairman was requested to investigate another place which had been suggested.

Tom Harvey '28 furnished a technicolor film with a sound tract, from the Carnegie Illinois Steel Company, entitled "Steel — Man's Servant." It showed the entire process of making steel — the procurement of the ore at the mine, its transportation to the mills, and the reduction of the iron and the steel from the ore, and then the casting, forging, and rolling of car wheels, journals, wire, rails, structural shapes, and steel plate. The many close-up views provided firsthand evidence of the more spectacular phases in the making of steel.

The following members were present: J. Lloyd Wayne, 3d, '96, A. I. Franklin '98, Franke C. Balke '14, John H. Babbitt '17, E. G. Peabody '21, S. C. Boyle '27, Bob Wallace '27, T. G. Harvey '28, Russell Fanning '30, S. H. Hopper '33, and Gordon E. Holbrook '39. The guests were William R. Mundy and John C. McAndrews, both connected with the Monarch Steel Company. The meeting adjourned at 9:30 P.M. — JOHN H. BABBITT '17, *Secretary*, 3734 Carrollton Avenue, Indianapolis 5, Ind.

Technology Club of New York

The big news is out now, so I'll do my best to give you the picture of our new club facilities as I have seen it. As you may or may not know, effective on January 1, the Technology Club of New York moved from the Williams Club, at 24 East 39th Street, to the Architectural League, at 115 East 40th Street. It is only one and a half blocks east and one block north of what we called our old stand. I think each and every one of us owes a big debt of gratitude to Sam Reynolds '22 and Bill Mueser '22, for finding the place, and to our old reliable Club President, George Dandrow '22, for negotiating the deal and keeping us from becoming actually a sidewalk Alumni Club.

These arrangements, it should be clearly understood, are but temporary. They do not offer us so much in some ways, as did our arrangement with Williams. In other ways, I think they offer us more. On the debit side of the ledger, we have no space for overnight guests, nor do we have a lounge or reading and card room. We have our application in with the League for the first room which becomes vacant, and when we get it, we will immediately fix it up to where we can lounge around with a bit more comfort. On the credit side of the ledger, I, personally, feel as if we were a bit more welcome, and perhaps not looked upon quite so distinctly as a bunch of interlopers. I think the food is better than at our old stand, and certainly there's more of it to choose from, better served and better cooked. Almost anything on our menu now is more reasonable than the prices we have been accustomed to paying. The Architectural League is set up primarily to serve lunches only, but I cannot stress too strongly that they have the facilities and are willing and desirous of taking care of class lunches and class dinners. Give them at least one month's notice, and I feel reasonably sure that class secretaries, or whoever is making arrangements, can be served and will not regret having taken their party to our new quarters. I should like to go even a step further and urge all classes and other groups to utilize the place, for in unity there is strength, and the better showing we make in our usage factor, the better will be our chances of improving our opportunities for service to our individual members.

In this connection, may I register a thought, with which you may or may not agree. Your officers and board of governors did not take any rash or imprudent steps, such as themselves to decide it best for us to move. The move came about only after much deliberation and discussion with the board of governors of the Williams Club. It appeared to be of benefit to all concerned for us to take the action which we did, namely withdraw from their quarters. Although the timing of the move was far from being that most convenient to Technology, we believed that the step would eventually have to be made and so decided to uphold the integrity of our thinking and strike out for ourselves. The present time was, of course, inopportune from the real-estate angle, but we have the finances solved. We are having trouble making up realty owners' minds for them, however, and cannot force them to sell. Then we have to conform to the New York City building codes, which in turn require obtaining priorities on building materials. I think all these obstacles save the first, might be overcome by your officers, but unwillingness to sell is a tough one. Your Secretary has received one or two letters from you, complaining about our present temporary quarters and implying that the writers would return to the fold when we have located our new permanent abode. The large majority of members, however, have strung along most loyally, realizing that in doing so,

we are greatly helped in obtaining the type of cuisine which we seek for all of us. So I ask your patience and support in this undertaking, which I assure you is foremost in our minds and actions.

Lobbie ('17) blew in to town on the 12th, and several of us had lunch with him. For the occasion, Dale Spoor '22, Bill Mueser, Joe Littlefield '17, Sam Reynolds, Bill Keplinger '24, Andy Mooradian '34, Jack Fruit '02, and W. R. Franklin '26 turned out. We discussed our plans with Lobbie and in turn received some helpful suggestions from him.

The Club played host at its annual luncheon for the M.I.T. men in town for the annual meeting of the Civil Engineering Society at the Hotel Commodore on January 16. Bill Mueser did a grand job as master of ceremonies, and Professor Breed '97 and Bud Wilbur '26 brought us up to date on Institute activities. Frank Gage '22 entertained at the piano. Ninety other Tech men turned out. Among them were the following: J. F. Andrews '33, J. B. Babcock, 3d, '10, G. E. Barnes '23, W. M. Bassett '02, H. L. Bickford '16, G. W. Bricker, Jr., '23, H. A. Butters, Jr., '34, C. E. Chase '03, M. W. Cowles '15, I. B. Crosby '17, A. R. Cullimore '07, F. B. Cutter '98, J. W. Daily, staff, C. G. Dandrow '22, Rolf Eliassen '32, C. R. Ellis '23, H. K. Fairbanks '20, D. A. Firmage '41, W. R. Franklin '26, F. D. Gage '22, Farley Gannett '02, L. M. Gentleman '22, G. T. Gilman '23, A. T. Glassett '20, W. R. Glidden '12, M. L. Grossman '26, Albert Haertlein '18, J. F. Halpin '22, L. C. Hammond '02, W. F. Hiltner '35, A. T. Ippen, staff, G. C. Jacoby '28, Y. S. Jui '46, K. R. Kennison '08, W. L. Keplinger, Jr., '24, D. E. Kepner '21, F. R. Klauck '38, M. H. Klegerman '28, Nathaniel Krass '18, G. G. Kubo '39, T. W. Lambe '44, R. F. Lathlaen '46, W. H. Latham '26, R. S. M. Lee '26, John Lowe, 3d, '37, E. R. de Luccia '27, E. L. MacDonald '13, F. E. Manley '24, Medwin Matthews '20, T. A. Middlebrooks '30, Louis Mitchell '15, W. H. Mueser '22, D. A. Ostrower '45, F. E. Peacock '17, J. E. Rehler '30, Lincoln Reid '29, K. C. Reynolds '25, S. C. Reynolds '20, J. M. Robbins '23, E. S. Rowell '33, M. G. Salzman '25, C. N. Sawyer, staff, George Schobinger '08, Nathan Schooler '24, W. J. Scott '18, A. L. Shaw '09, G. H. Shaw '04, E. S. Sheiry '24, A. L. Sherman '06, W. H. Smith '15, W. E. Stanley, staff, J. L. Staunton '35, D. E. Stearns '29, Hale Sutherland '10, D. W. Taylor '34, J. E. Ure '28, J. E. Walker '26, P. A. Warner '92, T. H. Wiggin '95, J. B. Wilbur '26, C. W. Williams '15, W. T. Wilson '04, W. S. Wise '23, S. I. Zack '22. — WILLIAM W. QUARLES '24, *Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York 18, N.Y.

M.I.T. Club of Philadelphia

The annual dinner meeting of our Club was held in the Burgundy Room of the Bellevue-Stratford on January 21. Edward L. Cochrane '20 and James R. Killian, Jr., '26 were the principal speakers and proved to be very able in presenting some interesting messages for us. H. W. Anderson '15 conducted the meeting until after the election of officers, when he turned the gavel over to George Whitwell '14.

Admiral Cochrane spoke of the future sea air power of the Navy and emphasized the necessity for continuing our preparedness in military power as a safeguard of peace. He reminded us that the corner policeman, although actually quite ineffective if all the people in the vicinity should decide on an organized revolt, is really a symbol of order and by his presence alone can do far more than a whole battalion of plain clothes men hidden away in the City Hall ready for an emergency. Similarly, it is fully as important to have adequate shipping capacity, armament, and munitions on hand, rather than to rely on the hope that the American ability to organize faster than any other country would enable us to rebuild our defenses in three or four years.

Dr. Killian told us some of the tremendous problems in the reconversion of M.I.T. for the peacetime student invasion. About 5,000 students are now taking over the Institute as compared with approximately 3,000 before the war. Financing, housing, and staff problems had to be solved in a hurry in order to keep Technology in the group of leading scientific schools.

Our Club voted to change its name to "M.I.T. Club of Philadelphia." This move is in line with the recommendation made last October by the executive committee of the Alumni Association, which maintains that the word "Technology" has in recent years become confusing to the mind of the general public. The nominating committee, headed by Garland Fulton '17, reported the results of careful investigation and recommended a slate of officers, who were subsequently elected by unanimous ballot. The following are thus the new officers for 1947: President, George T. Logan '29; First Vice-president, Henry S. Dimmick '22; Second Vice-president, Henry W. Jones, '26; Third Vice-president, Robert E. Worden '36; Secretary, Robert M. Harbeck '28; Assistant Secretary, Samuel K. McCauley '41; Assistant Secretary, Wiley F. Corl, Jr., '39; Treasurer, Charles W. Stose '22; Assistant Treasurer, Frank S. Chaplin '32; Executive Committee, Herbert W. Anderson '15, ex officio, Francis J. Chesterman '05, Joseph Greenblatt '22, Edward J. Healy '23, Wendell N. Currier '31, John Lawrence '32, Herbert R. Moody '41, and James F. Hoey, Jr., '43.

Thomas F. MacLaren '30, was recently appointed manager of the Philadelphia office of the Brown and Sharpe Manufacturing Company. At the regular December monthly meeting of E. I. du Pont de Nemours and Company, Charles A. Cary '12, assistant general manager of the rayon department and a member of our Club, was elected to membership on the board of directors of the company and advanced to the position of vice-president.

Burkhart Kleinhofer '39, has been doing a splendid job of organizing the reception committee. He appointed 33 Alumni on his committee, and all those at the dinner meeting made a serious effort to get acquainted with the newcomers in this area. Ed Healy and George Logan were on the sick list and unable to attend the meeting. Ed has been slowly recovering from a serious attack of pneumonia. He and his placement planning and guidance committee have been doing a great job in contacting and advising new men in the area in their search for position. Ed Healy has personally interviewed every applicant so far. The following Alumni and 14 guests attended the dinner: 1905: C. A. Anderson, F. J. Chesterman, B. E. Lindsly; 1907: H. W. Mahr, H. H. McChesney; 1909: P. H. Chase, T. C. Merriman; 1911: O. J. Gilcreest; 1912: C. A. Cary, C. L. Gabriel, H. H. Hanson; 1913: R. W. Weeks, R. K. Wright; 1914: G. E. Whitwell; 1915: H. W. Anderson, L. H. Bailey, H. F. Daley, Greville Haslam, H. E. Rossell, Solomon Schneider, E. A. Whiting; 1916: O. B. Pyle, Jr., E. A. Weissbach; 1917: J. J. Basch, W. J. Beadle, A. C. Carlton, Garland Fulton, H. F. Goldsmith, K. L. Harper, O. W. Holt, R. A. Pouchain; 1918: O. D. Burton, C. A. Lindgren, Jr.; 1920: E. L. Cochrane, Donald Royce; 1921: G. A. Chutter, J. E. D. Clarkson, T. A. McArn, R. M. Shaw, Jr.; 1922: P. M. Alden, A. T. Barclay, C. T. Chu, H. S. Dimmick, Joseph Greenblatt, H. D. Haley, R. S. Hayes, H. F. Metcalf, C. W. Stose, L. S. Vadner; 1923: R. G. Rincliffe; 1924: W. H. MacCallum; 1925: R. E. Cernea, C. B. Weiler, R. N. Wheelock; 1926: M. J. Bergen, Howard Humphrey, J. R. Killian, Jr., R. W. Richardson, W. E. Vaughan, F. E. Washburn; 1928: E. W. Boehne, W. B. Dean, R. M. Harbeck, G. N. Janes, O. W. Rideout; 1929: V. G. Miskjian, L. C. Peskin; 1930: N. F. O'Shea, W. H. Wannamaker; 1931: H. S. Smith; 1932: F. S. Chaplin, C. D. Cummings, E. B. McBride, J. R. McCaa, M. T. Meyer; 1933: H. F. Tucker; 1934: M. E. Richardson, Proctor Wetherill; 1935: G. R. Bull, Jr.; 1936: J. A. Myers; 1939: E. W. Clarke, Jr., B. A. Kleinhofer, J. G. Lord, F. W. Tobin, Jr., C. C. Wooster; 1940: J. K. Knight; 1941: C. W. Hargens, S. K. McCauley, J. S. Thornton; 1942: R. B. Hutchinson, W. J. Knapp, E. W. Smith, Jr.; 1943: Joseph Goodman, S. P. Higgins, Jr.; 1944: A. P. Barbato, V. S. Ezykowski, R. A. Metzger, P. W. Wilder, Jr.; 1945: K. V. Kratochvil; 1946: W. H. Peirce, F. B. Wilder. — ROBERT M. HARBECK '28, *Secretary*, 605 Foss Avenue, Drexel Hill, Pa. *Assistant Secretaries:* SAMUEL K. MCCAULEY '41, 288 Copley Road, Upper Darby, Pa.; WILEY F. CORL, JR., '39, Box 358, Bryn Mawr, Pa.

Technology Club of Rochester

Twenty-three students attended the Club's annual Christmas luncheon on December 26 and joined the 37 members in bringing the luncheon to record attendance! Avery A. Ashdown '24, Associate Professor of Organic Chemistry at the Institute, was also on hand.

Rochester area students enrolled this year at Technology total 36, a figure typical of the tremendous increase in Institute enrollment generally. At the time of last year's Christmas luncheon, only 11 Rochester area students were in attendance, and the year before, the number was six. Brief reports on life at Technology from the point of view of the present students were presented to the Club by Lester M. Slocum, Jr., freshman; Richard F. Morse, sophomore; David B. Lull, junior; Warren A. Bishop, senior; and Jane L. Berggren, graduate. No significant change in the academic program was reported by these students. Despite the complications of ac-

celerated studies and crowded living, the publications and other activities are in full swing. The athletic teams are popular and have enjoyed better than average success.

More than 5,000 students are now attending the Institute, Ashdown told the Club. Some of the temporary buildings used during the war by the Radiation Laboratory have been converted into dormitories, and these are the salvation of the Institute in providing living quarters for the flood of students. One building alone provides room for 600 students; the men live in groups of nine, and each group has one sleeping room and one study room. Homes for some married students are provided in the Westgate housing development, built under the direction of the School of Architecture, and there is a general expansion in Institute interest west of Massachusetts Avenue. Most rooming houses and apartments were filled to capacity long before the students arrived. Modernization of the Institute's facilities is going forward rapidly, Professor Ashdown said, with practically every department securing a reallocation of space, new desks and equipment, and general reconditioning after the war years. New construction is proceeding apace, and as previously announced, the Institute's plans are extensive. A new library is planned, to become the outstanding engineering library in the country, a Faculty Club and gymnasium are proposed, and many similar additions to the plant are under consideration. Ashdown nearly missed the luncheon, since his trip from Buffalo was delayed two hours by an early morning freight derailment. He arrived in time to bolt his lunch and talk, "after riding in a train all over western New York."

The resignation of John F. Ancona '03, as chairman of the scholarship committee and as honorary secretary for the district, was announced by our President, Ralph Peters '30. Dwight Vandevate '22 has been appointed by the Club and by the Institute to carry on both activities. For 18 years Ancona has been chairman of the scholarship committee, and for 15 years he has held the complementary post of honorary secretary. During this time the club scholarship fund has functioned admirably and helped a large delegation of students enter M.I.T. who otherwise could not have afforded it. As honorary secretary he has interviewed nearly every applicant for admission from the Rochester area, has advised the men on their preparation for the Institute, and has been their general counselor. Ancona's contribution to Technology and to the Club can scarcely be evaluated.

The following members and students attended the luncheon: H. E. Akerly '10, C. H. Alexander '39, J. C. Artz '40, A. A. Ashdown '24, Jane Berggren (G), W. A. Bishop (4–1), Geoffrey Broughton '36, H. F. Carver '32, A. E. Castle '40, E. S. Cohen (1–1), W. F. Coombs, Jr., (3–1), H. R. Couch '20, C. K. Crofton '22, John DeWitt (1–1), M. F. Doyle (1–2), R. A. Dunn '43, H. D. Eckhardt (4–1), E. S. Farrow '20, H. S. Gardner '30, J. S. Goldey '44, O. G. Goodhand '31, W. F. Halbleib (2–1), W. L. Hamilton '26, F. J. Hopkinson '20, J. M. Howell (1–2), F. J. Kolb, Jr., '38, E. P. Kron '34, T. J. Lamphier (2–2), H. H. Leary '23, D. B. Lull (3–2), K. J. Mackenzie '28, R. F. Morse (2–1), A. J. Murrer (2–2), C. C. Park (1–1), C. F. Payne '33, A. D. Perry, Jr. (G), R. W. Peters '30, D. R. Powers '49, W. P. Melville '20, E. H. Miller '23, D. W. Ramsey (1–2), E. E. Richardson '19, R. I. Reizenstein (2–2), Hrand Saxenian (3–2), J. B. Schutt (1–1), Howard Scott '43, W. M. Shempp (2–1), L. M. Slocum, Jr. (1–1), Gregory Smith '30, H. L. Smith, Jr., '39, C. J. Staud '24, D. E. Suter '38, W. F. Swanton '33, Dwight Vandevate '22, J. W. Vorndran (3–2), J. C. Vyverberg '39, R. G. Vyverberg '42, S. C. Wells '30, P. B. Wesson '98, R. M. Wilson '30, and C. L. A. Wynd '27. — Frederick J. Kolb, Jr., '38, *Secretary*, Building 14, Kodak Park, Rochester 4, N.Y.

Technology Club of Shanghai

The present officers took over on December 29, 1945, from a group of men who had served the Club loyally throughout the long weary years of Japanese occupation. Preservation of the structure of the Club during those difficult times was in itself a credit to our predecessors. For the purpose of record, the officers of 1946 have been R. F. Seedlock '40, President, Ji-Dah Woo '38, Secretary-Treasurer, and Teh-Ching Li '37, Assistant Secretary-Treasurer. Colonel Seedlock was absent on furlough from June to October; during his absence the Secretary-Treasurer and his assistant carried on.

In the period following victory, there was a general yearning for a return to normal and open living. The natural enthusiasm for a rejuvenation of activities and the desire to renew friendship among fellow members long separated probably contributed more towards the success of the year than anything the officers could ever devise. It was most gratifying to see the return of Alumni from enemy concentration camps, well and unimpaired from years of ill treatment. In particular, we were glad to welcome back P. S. Hopkins '10, the oldest Alumnus in Shanghai, who suffered the greatest abuse in the hands of the Japanese.

The year also saw a large movement of members to and from Shanghai, as it was the first time since war began that freedom of movement has been permitted. In general, the movement has been in, rather than out, resulting in the swelling of membership to more than 70. There was also a great influx of Alumni who are members of the United States Army and Navy. It gave the Chinese members of our Club an opportunity, not normally available, to reciprocate some of the hospitality extended to us during our years of study in the States. To mention the individuals would risk the omission of some, yet it would seem a gross negligence not to mention Admiral Willard A. Kitts '22, senior United States naval officer in this area, Lieutenant Commander R. S. Woodbury '28 (my English professor), and Colonel R. F. Seedlock '40, United States Army Engineer and President of our Club.

The first action taken by the present administration was to regulate the time and place of our monthly meetings. It was decided that whenever possible the meetings are to take place immediately after office hours on the last Thursday of each month at the American Club — the pre-war rendezvous. This helped members to plan their engagements and to prevent clashes with meetings of other clubs and societies.

Looking back over the nine meetings of the year, we feel that each was interesting and timely. A brief review of the main features may be pertinent: January — a speech on electric power supply by K. R. MacKinnon of the Ebasco International Corporation, widely quoted by the local press in reference to the controversy of public versus private ownership of electric utilities; February — an account of the medical advances in the war by Colonel George E. Armstrong, Surgeon of the United States Army Medical Department; March — a forum on the position of China's foreign exchange, conducted by E. Kann and M. D. Arnold, well-known local exchange experts, at a time when the regulations governing foreign exchange control were first put into effect by the Chinese Government; May — a joint garden party with the local Harvard Club, one of the leading social events of the season; June — a speech on the design and production of ships of the Liberty and Victory types by D. K. Hammel of the Consolidated Steel Company; July — a pleasant welcome to a surprise visit by a member of our Corporation, William S. Newell '99, and Admiral de Florez'll of the United States Navy, who were expert observers at the atomic bomb tests at the Bikini Atolls and took time off between tests to visit Shanghai; October — the showing of a film on M.I.T. student activities, secured by Colonel Seedlock on his recent furlough; November — a visit on board the U.S.S. *Helena* at the invitation of Admiral Kitts '22, which held record as having the largest turnout among all the meetings of the year; December — a mixed dinner party at the American Club, where about 60 members and guests enjoyed themselves at a table shaped like a *T* for Technology. — Teh-Ching Li '37, *Secretary*, 181 Nanking Road, Shanghai, China.

M.I.T. Club of Central New York

Freezing rain, sickness, previous commitments and the proximity of our meeting to the New Year holiday all contrived to make our January 2 gathering a slim one. The following brave, faithful souls, however, turned out for what was a very enjoyable meeting at the University Club of Syracuse: H. G. Reynolds '10, F. W. Barker '12, J. H. Kaiser '19, E. A. Gruppe '22, Natale Gada '26, M. W. Jennison '27, D. E. MacLeod '38, J. F. Owens, Jr., '40, and F. S. Hodgdon '42.

After an excellent roast beef dinner, we were entertained for two hours and a half by William D. Barnet of Syracuse. His colored moving pictures of several of his fishing and moose-hunting trips into northern Quebec were masterpieces of beauty and interest. It's too bad the rest of you fellows missed the show.

It was with a great deal of pleasure that your Secretary learned of another Tech man soon to come to these parts. He is Richard Henderson '38, who took time out to go to war and is now winding up his doctor's thesis. He plans to join the faculty at Syracuse University this summer. We'll be looking forward to seeing you, Dick.

Don't forget, those of you who are in the vicinity of Syracuse, N.Y., and are interested in getting together with fellow M.I.T. Alumni, to write to your Secretary if you are not now on the mailing list. — D. Earle MacLeod '38, *Secretary*, 211 Columbia Avenue, Syracuse 7, N.Y.

Washington Society of the M.I.T.

It has long been a matter for question whether our monthly meetings of past years were the most popular type of gathering that we could have, or whether a more varied program through the year would prove more attractive to the men in Washington. Our winter meeting held on January 10 at the Cosmos Club gave our President, Bill Mehaffey '17, a chance to tell us about his survey on this very question. Eighty per cent of the return questionnaires, reported President Bill, favored a decrease in the number of meetings a year, and at the same time, a program varied from one gathering to another. So, having opened the season with a trip through the David Taylor Model Basin, and the smoker at the Cosmos Club recorded in this report, Bill promises as coming attractions, a dance, a dinner, and a picnic, which we hope will appeal to you in goodly numbers.

Although a good many members often seen at meetings of the past years appeared at the Cosmos Club smoker, there were more new members than usual. The Executive Vice-president of the Alumni Association, H. E. Lobdell '17, who was the speaker of the evening, brought us up to date on the many Institute problems and the way they are being solved. Most of us agreed that the place would sure be a tough one to enter — at least a lot tougher than 20 years ago. From Lobby's description of the sifting process to which applicants for admission are subjected, we are sure that a second-rate man hasn't a ghost of a show of getting in at all, and a great many first-class students have to be passed over because of the physical limits of the Institute's capacity. The changes and additions to the staff mentioned by Lobby brought back a lot of memories. He left us all with the feeling that the Institute is wisely managed and that Technology will continue to hold its outstanding position among the finest schools of the world, as we know it deserves.

Present were: 1890: J. G. Crane; 1889: G. W. Stone; 1896: G. E. Stratton; 1903: W. L. Cook; 1904: F. W. Milliken, G. N. Wheat; 1906: A. L. Sherman; 1908: H. A. Rapelye; 1912: A. M. Pedersen; 1914: A. H. Waitt; 1916: F. P. Upton, W. E. Wentworth; 1917: W. C. Mehaffey, P. Y. Hu; 1918: H. D. Manuelian; 1919: D. A. Lundquist; 1920: John Nolen, Jr., W. M. B. Freeman; 1921: Richard McKay; 1922: R. K. Thulman; 1926: J. Y. Houghton, S. J. Cole, C. G. Moody; 1928: G. D. Mock; 1929: J. A. Plugge, Raymond Underwood; 1930: A. F. Bird; 1931: J. R. Vincent; 1932: R. A. Hinners, R. W. West, F. M. Moss; 1933: C. W. Bohrer; 1934: John Hord; 1940: E. G. Pollak, M. A. Abkowitz; 1943: L. A. Rupp; 1944: W. C. Sadler. — John A. Plugge '29, *Secretary*, 35 Oxford Street, Chevy Chase, Md. Albert F. Bird '30, *Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

CLASS NOTES

1888

We are very sorry to report the passing of George B. Prinz on November 29. By the kindness of Mrs. Prinz we are able to quote the following account of his life, which appeared in an Omaha paper: "George B. Prinz, 82, Omaha architect died at his residence. . . . Mr. Prinz had been recurrently ill for more than a year and had suffered an attack of pneumonia last August. His condition became worse. . . . He is survived by his wife, Flora. Two sisters and a brother live in Dayton, O.

"A member of the City Planning Commission from its beginning in 1916 until 1939, Mr. Prinz designed many Omaha homes and business buildings. His structures included the Northwestern Bell Telephone Company Building, the First Presbyterian Church, and the Woodmen Circle Building at Thirty-third and Farnam Streets. Mr. Prinz' former residence at 112 South Elmwood Road was noted for its interior design and finishing. . . .

"Mr. Prinz was educated at . . . Technology and spent two years studying in Europe before joining the architect's office of J. William Beal in Boston. He came to Omaha in 1891 and spent several years as chief draftsman in the office of T. R. Kimball. He started his own business in 1909. He was a member of the Omaha County Club, the Omaha Club, and the Association of American Architects. Mr. Prinz joined with Kimball, Steele and Sandham to design the Federal Building at Fifteenth and Dodge Streets. Gifted as a painter, he was known for his water colors. His library included one of the finest private collections on architectural subjects. He had lived at the Blackstone Hotel for six years." — Bertrand R. T. Collins, *Secretary*, 291 Nassau Street, Princeton, N. J. Sanford E. Thompson, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

1889

Gardner Pearson, in a pleasant note to the Secretary about the Secretary's book, *Boston After Bulfinch*, writes as follows: "It particularly interested me, because during the few years around 1911 to 1918, while I was the adjutant general, I found that in spite of high-powered explosives and cannon we were still making our armories like medieval forts with watchtowers and so forth, types of structure handed down from the days even before gunpowder, and were attempting to drill artillery, which then used horses, on a wooden floor in an armory. I managed to get the artillery outdoors in Lawrence and with enough more space around them in the big riding hall at the Commonwealth Armory at least to keep away from hand grenades or bombs."

Notice has been received from the Alumni Association, without particulars, of the death of William B. Willim of 116 East French Place, San Antonio, Texas, sometime in the spring of 1946. Edward V. French should now be addressed at 20 School Street, Andover, Mass.

The Salem evening *News* contained the following account of the life of Herman Parker, who died last spring on April 3: "Herman Parker, prominent yachtsman and Boston businessman, died at his home, 7 Redstone lane, . . . He was born in Boston 80 years ago, the son of the late Charles W. and Mrs. Mary J. Schoff Parker, and was the husband of Mrs. Lillian P. Percival Parker, who survives him. Mr. Parker was educated at Boston English High, the Chauncey school and was graduated from Technology in 1889. He was associated with Parker-Mears, architects; later with Macullar-Parker, clothiers, and until recently was with Burnham and Parker, wrought iron specialists of this town. A charter member of the Corinthian Yacht Club, he also belonged to the Eastern. He also leaves a brother, Ross Parker, of Marblehead."

The Secretary has had pleasant letters from Zenas Bliss, who said he had been "in the clutches of the tribal medicine man" but was better and would soon be out again, and Ed Marsh, who reported good health and reasonable activity. — Walter H. Kilham, *Secretary*, 126 Newbury Street, Boston 16, Mass.

1891

Walter Douglass sends in a clipping from a Lowell, Mass., paper, telling of the death of Ernest L. Libbey on December 26. We had not heard from him for many years. Walter's letter reads as follows: "Lennie Libbey, as we knew him when boys together in Lowell, has gone. Libbey and Guy Mitchell, also in '91, and I were close friends in Lowell, and good chums after that. But at Tech we were alphabetically divided as freshmen and thus separated; and then as sophs, we took different courses. They were in Mechanical Engineering, and I started with Chemistry and shifted to Civil. Hence we didn't see each other so much, and they formed a trio with Leland, and all three have now passed on."

The following is the newspaper account: "Ernest Linwood Libbey, a former resident of Lowell, but for the past 31 years making his home in Bridgeport, Conn., where he resided with his daughter, Mrs. William R. Schiller, at 985 Kossuth Street, died there . . . after a lingering illness. Mr. Libbey was born in Lowell, the son of Martin and Mary (Blaisdell) Libbey, and was educated in the local schools. Following completion of his secondary education at the Lowell High School, he matriculated at . . . Technology, from which he was graduated with the class of 1891. He was a mechanical engineer by profession and until his retirement Jan. 1 of this year, had been employed for over a quarter-century by the Remington Arms Company, at its Bridgeport plant. Besides his daughter, with whom he made his home, he leaves another daughter, Mrs. Frederick Lyons of Hartford; a son, Waldo M. Libbey of Stratford, Conn., and seven grandchildren. Mr. Libbey was a member of Kilwinning Lodge, AF & AM of Lowell, and Mt. Horeb Royal Arch Chapter, also of this city, and was the proud possessor of the 50-year Veteran's Medal presented him by the Grand Masonic lodge of Massachusetts. He also was a member of the 'Twenty-Five Year Club' of the Remington Arms Company."

In a previous letter, received in November, Walter Douglass wrote as follows: "I wish you had been with me last Saturday. I was down in the field behind the

house, looking over the grapevine trellis, which needs some repairs, and after that walked down toward the pine grove. Just as I rounded the corner of fence by our neighbor's orchard, I came upon a big buck, 100 yards distant, but looking at me. He turned leisurely away; then with a few leaps, he was at a boundary wall and over it most gracefully. A foot above the wall, was a barbed wire, but he cleared the whole thing like a 'flying red horse'."

Arthur Hatch reports his change in address from Brookline to East Weymouth, Mass. In a letter to Gorham Dana he writes: "I have moved to Hingham, as I found that it was not pleasant living alone. The housekeeper I had while in Brookline recently bought her aunt's house in Hingham, and I am living there as a guest. I am very fortunate, as she is a registered nurse and her husband has a fine position with the S. S. Pierce Company." Gorham Dana was nominated in November as vice-chairman of the Massachusetts Conservation Council.

A November letter from Robert Ball to Dana reads in part as follows: "We have had a delightful accession to our family in the return of my daughter, with her husband and son, from Africa. They have also brought with them my grandson whose father was killed in the war. We expect to have them for four months. It is eight and one-half years since I had seen my daughter, and I am meeting the other three for the first time. Mr. Barnes is a civil engineer in the Colonial Civil Service. For some years he was on the Welland Canal, and his knowledge of your country enables us to chop logic about soil conservation, hydraulic schemes and works, and all their attendant problems. He has the highest admiration for the Washington publication issued by your Conservation Service. He is very much interested in the bird life of Kenya and alive to the great beauty of some of the birds. The lakes are pink around the edges from the multitude of flamingos that settle along the shores. A delightful country to live in — they are right on the equator but nevertheless can see glaciers from their windows on Mount Kenya."

A recent letter from Horace Brand says that he is well and still active in business, which is mostly caring for the family real estate and dealing in coins. The latter business, or hobby, came about through his falling heir to a collection of rare coins left him by a brother. The *Americana* has this to say of his recent literary work: "In the literary field, Mr. Brand has finished a philosophy which he calls the 'Philosophy of Happiness' and he is about to have it published. This 'Philosophy' is based upon the theory; the welfare of a nation is based upon making more of its people happy; and in this philosophy is contained the philosophy of Socrates, and in the Brand working out of this philosophy are included the practical ways how it is to be accomplished; to 'Make More Persons Happy'."

A letter from Walter Hopton gives the following news: "We celebrated our 50th wedding anniversary on October 15 by flying to New York on October 9, spending three days in New York, and then going to Plainfield, N.J., to be with our children until October 17." — The sympathy of the Class is extended to Charlie Garrison, whose wife died in Santa Barbara on Christmas Day after only a week's illness. Charles's daughter was with him at the time, and his son and other relatives live on the West Coast. He retired some years ago, but his love of home life together with his hobbies of music and motoring have resulted in much happiness and contentment.

We have two changes in address: Charles H. Clark, Hotel Continental, Cambridge, Mass. Arthur E. Hatch, 110 Hill Street, East Weymouth, Mass. — Henry A. Fiske, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

1892

The passage quoted below from an article in the *Standard*, New England's insurance weekly, will be of interest to members of the Class. Fairfield was with us in Mechanical Engineering through part of our course at the Institute and is now vice-president of the Class. For many years, he has been the senior member of the firm of Fairfield and Ellis, now located at 60 Congress Street, Boston. The excerpt reads as follows: "A couple of weeks ago 'The Standard Said' column made reference to the appointment of Herbert G. Fairfield as special agent of the old Merchants of New Jersey and quoted The Standard of 50 years ago as saying that Mr. Fairfield 'is a man with an aptitude for field work' and that 'he will doubtless make a name for himself in his chosen profession.'

"Now comes a letter from Mr. Fairfield in which he says: 'In your "The Standard Said" column of last week's Standard appeared an item of human interest, particularly to the undersigned, and possibly to others in this everchanging business of insurance. Fifty years is a big slice out of any man's life. Mr. Rip Van Winkle slept only twenty and according to song and story "he was a lucky man." Well, "I've been lucky, too," because, as not mentioned in The Standard, by a happy spin of the wheel, my desk in our new office, after meandering up and down Kilby and Milk Streets for fifty long years, is again located very near to the selfsame spot as in my days with the "Merchants."

"'But this is the point, if I could have the fifty years to live over again, I'd try to get that same job again, even in these "headachy" insurance days (though I can't recall what happened to the "Merchants"), with the prayer that I might end my days, thanks to our loyal customers and our splendid companies, with as good an anchorage as the "Ground Floor Office on the Square" now furnishes me. And, also, I'd marry the same girl I did when I proudly got the Royal Exchange job a couple of years later (if she would have me). I hope this does not sound smug, as it is said humbly and with much gratitude to the insurance business, which is now rightly, I think, a legitimate part of the commerce of our country.

"'So here I am, then, on borrowed time, still peddling insurance, putting in my time card for forty hours a week, while not loafing for over-long rests on the shovel, and hoping that Uncle Sam will permit me a couple of days a week for the take-home cut. And so hoping we both make your "100 Years Ago" column while (as Ethel Merman sings) "Doing What Comes Naturally," "I hope! I hope! I hope!" Yours in a nostalgic moment, H. G. Fairfield.'"

Word has recently been received of the death of another of our classmates, Charles P. Cogswell, on September 12, in his 78th year. He was a New Englander, born in Norwich, Conn., and attended Norwich Academy before entering M.I.T. in 1888. Cogswell was graduated in Civil Engineering, apparently having specialized in railroad engineering. Early in his career he entered the railway supply business with the Railroad Supply Company in Chicago and about 1920 became a partner in, and afterwards owner of, the Squire Cogswell Company, with offices on South Dearborn Street, Chicago. He was married in 1916 to Annie L. Cogswell. He was a member of the Chicago Engineers Club. — Charles E. Fuller, *Secretary*, Box 144, Wellesley 81, Mass.

1895

We are very glad to announce that Andrew D. Fuller has accepted the appointment as class representative on the Alumni Council, an office made vacant by the death of Henry D. Jackson.

Your Secretary had a "vacation" of 41 days in the hospital and has returned to his normal activities, greatly refreshed by the experience. The notes in the previous Review were edited by his faithful "secretary," Mrs. Yoder. — Luther K. Yoder, 69 Pleasant Street, Ayer, Mass.

1896

The Secretary was made happy at Christmastime by receipt of greetings from numerous classmates, including Mark Allen, Arthur Baldwin, Bakenhus, Eynon, Flood, Myron Fuller, Hersey, Perry Howard, Jacobs, Lythgoe, Melluish, Partridge, Rutherford, Rockwell, Smetters, Sager, Tilley, Tucker, Wayne, Waterman, and Young. The Secretary also extracted much pleasure from a visit by Jacobs, who spent a whole week as guest in his apartment in Brookline while attending the meetings of the American Association for the Advancement of Science. A call from Lythgoe in early January on the Secretary, at his office at M.I.T., led to the opportunity for the two of them to lunch together in Walker Memorial. Lythgoe was working in the Eastman Library at M.I.T. on the job of translating an article from the German. He reported that even though he had been retired for some little time he still makes fairly frequent visits to his old quarters in the State House in Boston, where he says his former associates not only welcome him but continue to confer with him regarding their problems. He had to confess that in spite of his retirement he had not yet succeeded in completing that long-standing job of clearing out his attic. The Christmas greetings from Partridge were sent from Sumter, S.C., a place which he had reached on his southern trek. The last word from Charlie Tucker was that he had convalesced sufficiently to get home from the Lawrence hospital and was expecting to be up and out again in the near future.

Reprints of The Review report of the observance of our 50th anniversary were sent to all classmates who were not subscribers, and the Secretary has some left over, so that if any classmate desires to have the story complete as published in the November and December issues of The Review, he will be very glad to satisfy that desire.

Helen Chamberlain Dodd wrote right after Christmas that she was then in Arlington, Va. She had been having a great time visiting her children, spending Thanksgiving in New York and Christmas in Washington; after completing her stay in Arlington she was to go on to Tennessee, and finally land in Jacksonville. She was due back in Newbury, Vt., in April and expressed the wish that some of the '96 classmates would call upon her there during the summer.

Two recent letters have been received from Myron Fuller, who is at 4 Rhode Island Avenue, Fort Myers, Fla. He wrote that he had spent the summer in Massachusetts and had enjoyed a week's camping trip in the Berkshires and another in the White Mountains of New Hampshire. He was fortunately able to buy a new car, so that in October he drove to Texas by way of the Ozark and Ouachita mountains. In Texas he stopped at Fulton and Rockport, where he had been marooned during the war by lack of gasoline to get away. From Texas he traveled east to Florida and was happy to find that his bungalow in Fort Myers had not been damaged by the Tampa hurricane, although the water had backed up in the streets and flooded a smaller cottage in the rear, also owned by him. His tenants had to take refuge temporarily in his larger cottage, which was at a higher elevation. Myron says that he is now registered as a voter in Florida and has taken out Florida registration and operator's license for his car, so that he has become as much of a Southerner as it is possible for a Yankee to be. His present life in Florida is apparently just ordinary routine. He goes on an occasional drive and has a picnic once a week or so. He had a fine Christmas dinner at a hotel in Punta Gorda. On New Year's Day he took the four-mile ferry to the islands of Sanibel and Captiva near Fort Myers. It was the first time that he had been there for 30 years, but there seemed to be little change.

Con Young and Abby are located for the winter in Apartment 11, the Adelphia, 449 Seventh Avenue North, St. Petersburg, Fla. Con wrote that after our reunion he became a sufferer from stomach and follow-up disorders, for which the doctor prescribed a *B* Complex of high potency. This cleared up his trouble but left him feeling like a dope addict for several weeks. They left Cape Cod on September 29 and stopped over a week in Bridgeport, Conn. They also stopped over with a friend in St. Davids, Pa., and arrived in St. Petersburg finally on October 13. He had lost some weight and was not feeling quite up to snuff, although the rest which they secured on their trip south had been beneficial. They suffered from the hot spell in Florida after their arrival, and on top of it all he had dental trouble, which the dentist succeeded in remedying. A cold spell, with no heat in the radiators, brought on a chill and an attack of neuritis, which he said was the worst he had experienced in 20 years and sleep and rest were out for two nights. With it all he has been feeling rather tired, doing very little walking, and taking no auto trips. He was spending considerable time on the couch, but was definitely feeling the benefit, and was having longer periods of rest and sleep at night.

Classmates will learn with much regret of the passing of Mrs. Henry Hedge, who died suddenly on January 8. The sympathy of us all goes out to Henry in his loss. — Charles E Locke, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. John A. Rockwell, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1897

On December 20, Jere R. Daniell, XIII, visiting Assistant Professor in the Department of Naval Architecture at the Institute, presented to Lieutenant Commander Owen D. Huff, U.S.N., skipper of the frigate *Constitution*, a copy of the Boston *Gazette* of May 13, 1813, in which is described the victory of the *Constitution* over the British frigate *Java*, the finest ship at that time in the British Navy. In the article, which quoted a London dispatch, was a passage which read: "The superiority of the Americans consists not so much in the length of their frigates, or in the number of their hands, but in their precision and quickness of firing — the result of exercising their guns every day for six or seven years in succession." This was followed by other paragraphs telling of the efficiency of the American Navy. The newspaper was discovered by Mr. Daniell's brother of Greenland, N.H., in an old weather-tight storehouse on his farm. It was in a bundle of old newspapers, all in an excellent state of preservation. The gift was made to the United States Navy and will be mounted in a special airtight frame. It will then be placed on exhibition somewhere in "Old Ironsides."

David T. Whiton, II, died in Hingham Center, Mass., on October 29 after a brief illness. Mr. Whiton spent the greater part of his working life in the shipbuilding industry and was among the pioneer workers at the Fore River shipyard in Quincy, where he helped draw up the plans for the original plant. For 15 years he was located at the Electric Boat Company in New London, Conn. He attended Hingham schools and was for many years a member of the parish committee of the Old Ship Church. He served for 10 years in the Massachusetts State Guard and was two years in the Connecticut state Militia. He leaves a widow, one son, and one daughter, the latter being a storekeeper, first class, in the Naval Reserve. Interment was in the Hingham Center cemetery.

Your Secretary has only lately been advised, without other particulars, of the death of Charles B. Clark, I, in Baltimore, Md., on February 24, 1946.

In response to a brief note from Harrison W. Smith, VI, expressing regret that he would not be able to attend our 50th reunion, we had but recently sent our regret and asked for a long, social letter that we might publish in the class news column, when we received word of his death on January 3 in Papeari, Tahiti, in the Society Islands, where he had lived for 25 years. The Boston *Globe* of January 10 contained a rather full account of his life, and that of January 12 published a letter of tribute from the author James Norman Hall. After graduation from Harvard College in 1895, Smith came to the Institute and spent two years, receiving his bachelor of science degree in 1897. From 1898 to 1901 he taught physics; and from 1901 to 1917, electrical engineering, at M.I.T., becoming an associate professor. In 1901 he went on the Technology expedition to Sumatra as one of the observers of the total eclipse of the sun. In 1909 he went to the South Sea Islands, New Zealand, Australia, and the Malay Archipelago, and as a result of his studies there of birds and butterflies he was made a fellow of the British Royal Geographical Society and the Royal Asiatic Society. In 1915 he went to Verdun as an ambulance driver in the American Volunteer Ambulance Corps and in 1917 was appointed by the United States Navy an instructor and dean of the Naval Aviation station on the Institute grounds by the Charles River Basin. A short time was later spent at his farm in Springfield, Maine. In 1921, the lure of Tahiti called him, and he took up his residence in Papeari. Like Henry D. Thoreau, he decided what he wanted to do to be happy and then went and did it. His lifework was to seek among the other islands for tropical fruits and plants that did not grow in Tahiti, then bring them back and foster their growth on that island. For his efforts the French Government honored him as "Chevalier de Mérite." As side issues, he experimented with the crossbreeding of bees and maintained a copra plantation. We well recall his genial presence at several of our class reunions, when he entertained us all with tales of his experiences in the South Sea isles. The bulk of his $600,000 estate was left to Harvard College. — John A. Collins, Jr., *Secretary*, 20 Quincy Street, Lawrence, Mass.

1898

A tentative blueprint is beginning to emerge for the 50th. It will be remembered that Howard Bodwell, writing from California, stated that he would bring his golf clubs to the 50th. Along comes George Cottle, a member of The Country Club, and suggests that he would be pleased to secure the privileges of the club for '98 for one day of the reunion. Roger Babson intimates that he would be pleased to be host to the Class for another day at Babson Park. Lester Gardner, after conferring with George Treat and George Cottle and corresponding with Roger Babson, sends a letter with a complete outline for the 50th. However, reunions do not spring full-grown as the fabled goddess Minerva did from Jove's head, and a blueprint is an outline of work. Fortunately, there are a good many self-starters in '98. Make the reunion your responsibility. Send your plans. In the near future we must have a dinner meeting at Walker Memorial and get down to cases — select a plan, choose a chairman, and appoint committees. Remember the last dinner meeting, in which the present Secretary was elected in his absence. If you wish to be chairman for the 50th reunion, stay away from the meeting.

The Godbold travelogue continues thus: "The next morning we passed over the Mississippi River on the great steel truss bridge that carries the railroad as well as vehicular traffic, the latter on each side and the railroad in the middle. The view from this bridge takes in a long stretch of river with all the river activities of the boats, barges, and other craft along the water front of a busy city. After crossing the Mississippi, the route is through Little Rock and then Fort Smith, over country

that is generally taken over for cotton, and in the cotton-picking season truck after truck is passed, carrying cotton from the fields to the gins. As these trucks have open tops, the cotton is blown all over the road, and one wonders if it wouldn't pay to rake up what is scattered so widespread. At Forrest City it was convenient to stop and see a gin in operation. Everything works with little effort and no confusion. When the spout is placed in the truck full of loose cotton, the cotton is drawn up like water in a straw and is not seen again until it comes out at the other end of the gin as nice clean cotton and goes into the baler, where it soon builds up to a large bale and is wrapped in burlap and strapped. The seeds make a constant swishing noise as they are carried through the system. In order to limit our mileage to a reasonable figure, we stopped for the night at Ozark, recording 262 miles for the day.

"Here we found a tourist court and café combination, neither of which was anything to boast of. But we were fortunate in stopping here, as we met travelers from the West who warned us of a heartbreaking detour between Fort Smith and Oklahoma City. They advised us to go north to Tulsa and then to Oklahoma City. This route would be 50 miles out of our way but would avoid 20 miles of rough road. We took their advice and in the morning turned north at Alma, Ark., and drove 50 miles up to Springdale, Ark., over the western ridge of the Ozark Mountains — a very beautiful drive looking across the mountain crests and down into the depths of the valleys between. At Springdale we turned west and were soon out of Arkansas and into Oklahoma, where we proceeded due west to Tulsa, 204 miles, making rather an easy day. Tulsa strikes one as a genteel kind of a city. Perhaps we were somewhat prejudiced by having found a nice cafeteria at a time when we were hungry for good food. But it impressed me as a very pleasant town.

"The next day, as we left Tulsa, we crossed the Arkansas River, which was quite a river at that point, having been reenforced by the Cimarron, about 20 miles above Tulsa. The day's drive of 226 miles is remembered for the tremendous number of cattle trucks carting cattle to market at Oklahoma City. As we passed each truck, the stench was terrific. We wondered whether there would be any cattle left on the ranges; and yet as we proceeded, the ranges seemed to be well populated. We were told along the way that the range feed was getting scarce. This was in August when meat controls were not in force. Just beyond Oklahoma City we passed Fort Reno, now used as a remount station. We saw miles and miles of enclosed grazing land and plenty of stables, but not a single horse. The country was getting flatter and more open all the time. Being on U. S. 66 we found plenty of traffic, which meant plenty of stopping places, but it was still necessary to stop early to insure a place to sleep. So we drew up at Elk City in time to select a cabin in the tourist court.

"We got an early start next day and were soon in the Texas Panhandle, where the road is straight for miles and miles and the country so flat that for scenery all you see is a distant windmill and a cluster of trees marking a ranch home. This is lovely driving country, however, and after a drive of 258 miles, we were across the Panhandle and over into New Mexico at Tucumcari, having passed through Amarillo with only a pause to get the car greased. Tucumcari seems to have been selected as ideal for the tourist court business. It is so located that if you don't stop there you won't find another place for at least 100 miles in either direction. The result is that the whole eastern part of the town is being built up with nice substantial courts. The owners are probably justified." *(to be continued)*

As we were walking in the Back Bay Park the other day, a cheery voice saluted us, and there was Richy. He was driving down to Clarendon Street to inspect a monument erected on the Esplanade to the memory of Edwin U. Curtis, police commissioner at the time of the celebrated Boston police strike. Many of our members who were in the National Guard at that time will well remember the occasion. (This was the strike that started Calvin Coolidge on the road to the Presidency.) Richmond designed the monument about 20 years ago, when he was with Guy Lowell. It is a work of art, consisting of two upright pillars of granite, one on each side of the walk; and there are adjoining exedra seats. The pillars, about two and one half feet square and eight feet high, are beautifully ornamented, suitably engraved, and surmounted by graceful vases. The seats, in the form of a semicircle, are very comfortable, a little cold on a winter day, but in perfect condition. Richmond explained that the perfect condition was due to the quality of the granite, a whitish granite from Connecticut. "Pressed stone," he remarked, "after 20 years would have been badly weathered." He is designing a similar monument for another client. Congratulations on the impressive and lovely monument, Richy, and thanks for the ride and the visit.

"Have you had lunch, Ed?" came over the telephone in vigorous tones, readily recognizable as the voice of George Anthony. George was en route from his home in the forests of Michigan to visit his daughter in the forests of Maine. His train, arriving from Detroit during the period of the recent coal strike, was three hours late. Ed, unfortunately, had just returned to his office from lunch, but we had a long telephone confabulation — about economic conditions, George's plans, '98 affairs, Alumni Fund, the 50th reunion *et al.* George thought that he might not be able to get through to Maine because of the hectic transportation situation. He has since written that he was able to make it. Thanks for the call and the letter, George. Next time, send a wire in advance, and we will be waiting for you at the gate with bells.

Another of our classmates, Earle C. Emery, has passed within the Unseen Temple. Through the courtesy of the Review Office, we have the following clippings. From the New York *Times:* "Earle Caldwell Emery, former industrialist of Bradford, Pa., died . . . [on October 31] in Clearwater [Fla.] of a heart attack. He leaves a widow, Mrs. Mildred V. Emery of Clearwater." And from his home city, Bradford, Pa.: "Mr. Emery was the last surviving member of a family that was prominent in this area since 1875. He was one of the leading independent oil men in the country. Born in Titusville, Pa., Mr. Emery was graduated from . . . Technology. He went to Alaska during the gold rush and later to South America. After serving in the first World War as a lieutenant, he went into the oil business with his father. Later he helped form the Oil Producers Association to fight the growing powers of Standard Oil Company, carrying the battle into Congress to curb unjust discrimination by railroads. At his death Mr. Emery was president of the Minard Run Oil Company, the Lewis Emery Jr. Inc. Oil Company and the Emery Hardware Company. He also was a director of the Oil Producers Association of Pennsylvania."

Classmates will remember that Earle was prominent in athletics during his student days at the Institute. He was a member of the '98 baseball team and of the Technology football team and excelled in these sports. He could just whang out a three-base hit and make a 20-yard run for a touchdown. He attended regularly the reunions of the Class and was looking forward to the 50th. We shall miss him. He was interested in M.I.T. affairs and responded generously to all appeals. — EDWARD S. CHAPIN, *Secretary*, 114 Federal Street, Boston 10, Mass.

1899

The following biography of one of our classmates appeared in the January 6 issue of *Health News*, official weekly publication of the New York state department of health: "Mr. Burt R. Rickards, director of the Division of Public Health Education since 1922, retired on December 31 after nearly thirty years' service in the State Department of Health. His retirement climaxes a long and fruitful career in public health as bacteriologist, teacher, editor, and notably as health educator. A graduate of . . . Technology, he was for five years assistant director and for three years director of the Boston Health Department Bacteriological Laboratory. He later became chief of laboratories of the Ohio State Department of Health. In 1904, with Dr. H. W. Hill, he took over publication of the *Journal of the Massachusetts Association of Boards of Health* (now the Massachusetts Public Health Association) and eventually became editor-in-chief. Subsequently he secured a contract to publish the proceedings of the American Public Health Association then recorded in a volume issued annually. He renamed the publication the *American Journal of Public Hygiene* which he turned over in 1912 to the Association as its official organ after having been its editor for a period of eight years. From 1910 to 1912, he was associate professor of municipal and sanitary dairying at the University of Illinois, following which he was associate director of the biological department of the Eli Lilly Company at Greenfield, Indiana, in charge of the organization and development of the antitoxin and vaccine laboratories.

"Mr. Rickards joined the staff of the New York State Department of Health in 1917 and during the ensuing twenty-nine years served under four commissioners. For the first five years he was assistant to the deputy commissioner and in 1922 was appointed to the position of Director of

the Division of Public Health Education. During that year, only a month after Station WGY, Schenectady was established, his recognition of the importance of radio as a medium of health instruction led to the preparation of a series of five-minute health talks which were presented over that station. The use of radio as a means of providing health information to the public was a new idea and became popular immediately. This lecture series continued until 1933 when it was succeeded by a weekly program in the form of fifteen-minute dramas, written, acted and produced by members of the department staff, which were later recorded and used weekly on an average of more than twenty stations throughout the State.

"In 1924, Mr. Rickards developed HEALTH NEWS, then a monthly bulletin, into a weekly paper covering activities of interest to both professional and lay readers. He was its editor continuously to time of his retirement. As personnel and facilities increased, he revised and illustrated other department literature then available for general distribution and augmented the subjects covered in an effort to bring the material to a high standard of excellence for this form of health education. Another development under his administration has been the production and distribution of health motion pictures, several of which have been completed and shown in theaters throughout the State. During an epidemic of keratoconjunctivitis, the scientific material regarding this disease, prepared by the country's leading authorities on the subject, was presented by means of Kodachromes and photographs in natural color. In addition, a library of 150 subjects and 600 films has been acquired for loan to interested groups, including schools, parent-teacher associations and public health organizations. As a result of his effort, qualified artists and photographers were added to the division staff to expand the production of health posters, exhibits, pamphlets and similar work.

"Through his initiative, the Department of Health of New York State was one of the first to inaugurate a program of home and farm safety designed to prevent accidents and to reduce the number of injuries and deaths from that cause. As general chairman of the New York State Home and Farm Safety Advisory Committee, he has guided and developed effective plans for safer living in the home and on the farm. Mr. Rickards has made numerous contributions to health education, through lectures and published articles. He maintains membership in many local clubs, both professional and civic, in which he has created a sustained interest in public health activities. He is a life member and Fellow of the American Public Health Association and holds a forty-year membership certificate from that organization. He is also a member of Sigma Xi, an honorary scientific society, and of Delta Omega, honorary public health society. Mr. Rickards' genial, friendly spirit and his interest in people and civic activities will open the road to an enjoyable retirement. He leaves the Department with the good will and best wishes of all of his associates."

Further details in regard to the professional career of Winthrop R. Dodge, V, notice of whose death in November, 1945, has already been recorded in these columns, have recently been received from Mrs. Dodge. After leaving Technology, Winthrop took a postgraduate course in mining and metallurgy at the Colorado School of Mines. For a number of years thereafter he was engaged in designing and developing cyanide plants in Mexico and in San Juan County, Colo., for the recovery of uranium from mine tailings. Later his interests turned to the recovery of gold from mine tailings in the Dehlonega, Ga., field. Dodge's next move was to the Tennessee Coal, Iron and Railroad Company's plants at Birmingham and Russellville, Ala. In 1915, when gold was discovered in northern Ontario Province, he became associated with the Hollinger Mine at Timmins, Ont., where he remained until ill health caused his retirement in 1944. His death occurred on November 23. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

1900

A letter from Jim Patch, written from Baton Rouge, La., follows: "Mrs. Patch and I are being inducted into Louisiana life, much to our delight. We are visiting with my son Ralph and his family. Ralph is assistant manager in charge of production of the chemical products division of the Baton Rouge refining plant of the Standard Oil Company of New Jersey. It was here that the commercial production of the rubber substitute began under Ralph's supervision. I have been reading Ralph's copy of The Review (he is an M.S. from M.I.T.) and noted in the 1900 notes of the November issue that 'Ziegler called at the hospital to see the scribe the other day.' What does this mean? If you had told a fellow, I would have called too. I hope you are well again." Others seen or heard from in the last month are Fitch, Ziegler, Burroughs, Draper, Hapgood, Wastcoat, Crowell, Allen, Rand, Smith, Comey, and Jackson.

Osgood, from the Johns Hopkins Hospital in Baltimore, writes: "I am retiring this week end to Sarasota after a month of activity in the surgery here. I guess we have much to be thankful for. My neck glands became overactive, requiring removal of affected parts, and so forth. I shall enjoy returning to the South for the winter months. The place rented as a whole this year, except the small residence which is for our own use when everything else is taken. I am glad you came through your troubles after the summer in the hospital and hope that we may both go along favorably until we get together for the 50th." — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston 9, Mass.

1901

When a change of address came in for Ed Church, I called him on the telephone at the new address, 1282 East 24th Street, Brooklyn 10, N.Y., to check up on him. He says that he is now retired after 28 years at the Polytechnic Institute of Brooklyn, where he has been professor of mechanical engineering and department head for some years. He felt that he needed more time to do some of the things that he had always wanted to do. He still has one class at the institute. Ed is rewriting one book and writing another one. He said that he was glad to see Harry White in the class photograph as he used to see a great deal of him in years gone by — also that he was sorry not to have been able to attend the reunion but could not because commencement came at that time.

Phil Moore writes, in part, that he has bought a farm in Maryland in what, I think, is known as the "eastern shore" section. Mrs. Henry R. Gilson writes that Henry has been incapacitated since August, 1944, but is much better than he was two years ago.

I report with regret the death of Orlando S. Stockman on December 6 at his home in Lancaster, Pa. The newspaper clipping quoted below is from the *News*, Newburyport, Mass.: "Orlando S. Stockman, 68, a native of Newburyport, and assistant secretary of the Armstrong Cork Company, until his retirement last April, died at his home in Lancaster, Pa. . . . He was associated with the concern 43 years, entering his duties soon after graduation from . . . Technology. Mr. Stockman attended schools here and was graduated from Newburyport High School. He was the son of the late Joseph Stockman and Rhoda (Sargent) Stockman, his mother formerly residing in Merrimac. He resided in Cambridge and went to Pennsylvania. The Newburyport native leaves a wife and daughter. The family had a summer home in the Lake Winnepesaukee region." — GUY C. PETERSON, *Secretary*, 788 Riverside Drive, New York 32, N.Y. THEODORE H. TAFT, *Assistant Secretary*, Room 3-266, M.I.T., Cambridge 39, Mass.

1903

Notice has been received of the death of Gerald F. Loughlin, XII, in Washington, D.C., on October 22. Born in Hyde Park in 1880, he was graduated with us as a geologist, then attended Yale, where he received his doctor's degree in 1906. He came back to the Institute as an assistant in geology from 1906 to 1912. He then went with the United States Geological Survey, spending the rest of his life in various positions with the survey: first as chief of the nonmetals section, and finally as chief geologist from 1935 to 1944; from 1944 to his death, he was special scientist. He was a member of half a dozen mineral, geological, and scientific societies and was the author of numerous papers on ore deposits and minerals in various parts of the country from Connecticut to Utah. Between 1919 and 1924, he was in charge of the preparation of a six-volume report on the mineral resources of the United States. He is survived by his widow, the former Grace E. French, and one daughter, Mrs. Wilbur S. Burbank. He was of a quiet and reserved disposition, completely absorbed in his work and, according to Hewitt Crosby, who occasionally met him, it was practically impossible to get him to attend M.I.T. meetings. He was another outstanding '03 man in his field and is a loss to the country.

Myron Clark has been appointed director of an institute of labor-management relations at the University of Connecticut. — An appreciation of Walter M. Drury, written by A. W. Edelen, assistant manager of the American Smelting and Refining

Company, appeared in the November issue of the *Engineering and Mining Journal* in part as follows: "Mr. Drury was admired throughout the profession for his great abilities in handling the many intricate and difficult problems which came up for a quick decision. His vision and thorough understanding were really uncanny. His criticisms were always welcome, for they showed a profound understanding of the subject. He rose from an engineer to vice president of the mining department of the American Smelting and Refining Company." — FREDERICK A. EUSTIS, *Secretary*, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 441 Stuart Street, Boston 16, Mass.

1905

I wish I could send all '05 men a copy of the special edition of the Portland, Maine, *Express* dedicated to Jim Barlow at the termination of his career as city manager of Portland. Jim had been on the job for 18 years. The special edition (a very unusual thing in a big city paper) must have caused Jim to remember that "every knock is a boost." The pictures of Jim and his new farm home at Sabbath Day Lake, to which he has retired, the pictures of the next-door cemetery, the "doghouse" to which Jim may sometimes be consigned, with a regular and strip cartoon, "Generous Jim," all show directly or in reverse English, the esteem of his fellow citizens. As a matter of fact, the display of this paper at our next reunion should be a sufficient reason for journeying across the country, if necessary, to see. Jim, although retired, hasn't wholly retired. He was in our office a few weeks ago, on his return from a consultation with a New York City department desirous of knowing how a city should be run.

The rest of the news this month isn't so happy. Professor Henry H. W. Keith, XIII, retired head of the Department of Naval Architecture at M.I.T., died of cerebral hemorrhage on December 2 at New Bedford, Mass., where he was visiting relatives. Henry had not been well for some time, yet after retiring from his work at Technology, he returned to the emergency of the Bethlehem Steel Company at the beginning of World War II and was responsible for the successful launching of all the large ships built at their Quincy, Mass., division. After graduation, Henry was engaged in research at the United States Experimental Model Basin at the Navy Yard in Washington, returning to the Institute in 1910, as instructor. During World War I, he served as lieutenant commander in the Naval Reserve Construction Corps. He became a full professor in 1928. In 20 years of consultant work at Fore River, he launched successfully more than 100 vessels, including the carrier *Lexington* and the battleship *Massachusetts*. Henry left a wife and a daughter, Mrs. Edmund Harris of Needham. Gib Tower, XIII, and Andy Fisher, X, attended the funeral services at New Bedford. We have a few spare clippings of the obituary with Henry's picture, if you wish to send in.

Another unhappy thing to record is the stroke that hit Harry Wentworth early in December. I had seen Harry the week before; he seemed the picture of health and was very happy about the return of all three sons from the war. Within a week, I learned that he was confined to his bed, had lost the use of his right arm and legs and was in a serious situation. By Christmastime, however, he was able to get into a wheel chair and have dinner with his family. According to the last report, he was gaining slowly but steadily. A letter from him says, "I am going to get well," and that's grand news. In response to some letters I had written a number of the fellows, Norman Lombard, II, wrote Harry, sending me a copy. To my surprise, Norm had apparently gone through a similar experience, but by sheer will power had brought himself back quite a bit on the road to recovery. Norman's philosophy as regards his misfortune was wonderful. Mrs. Wentworth said it helped Harry a lot, as did the numerous letters from other classmates. His address is Henry A. Wentworth, 221 Woodland Road, Auburndale, Mass.

The '05 Boston Gang seem to be doing their share in making a success the daily luncheon club project for M.I.T. men at Thompson's Spa. Out of 75 registered in the attendance book, 10 were '05 men. At a meeting of the 1947 reunion committee at Thompson's on December 10, attended by Graesser, Files, and Goodale, committee members, and Gilman, Loughlin, Shapira, and F. W. G., kibitzers, it was decided to make at once a reservation for some place on Cape Cod similar to last year's hostelry, for whatever week end in June we could find accommodations. Arrangements have since been completed to hold the 42d reunion at East Bay Lodge (the same place as last year) on June 13, 14, and 15. You will receive a registration card at the proper time. It is not intended to ballyhoo this reunion unduly, or to conflict with Alumni Day at Cambridge on the 14th, but for those who have the annual habit and enjoy communing with old friends, it will offer a happy week end.

There was a time when Andy Fisher had only one grandchild and used to argue that quality was more important than quantity. I see his point, because my first grandchild, a boy, was born to my daughter, Marjorie, at San Diego, Calif., on December 9. I get the quality angle from Grandma Ruth, who was in San Diego at the time, also from an entirely impartial observer just returned. I expect to discuss the matter of quantity a few years hence.

Grafton B. Perkins, V, advertising and consumer relations counsel and vice-president in charge of advertising at Lever Brothers, Cambridge, was recently appointed chairman of the Boston Metropolitan Red Cross public relations committee. It is claimed that Perk originated the comic strip advertising in magazines. For samples, see your Swan Soap ads. In the Boston *Herald* we note the arrival of another '05 grandson, Charles Talmadge Bell, at Needham, Mass., Bunny Loomis' grandson. Charles Mayer, IV, seems to be "on the hoof." His address for the next four months will be 2018 Adams Street, Madison, Wis. John S. Loughlin, II, having retired from Factory Mutual, is living at his new farm (may be potatoes, may be quahogs) at 1 Hickory Street, Lanesville, Mass. (Cape Ann). Albert L. Smith, V, may be doing the same, as he has retired to Crane Neck Road, West Newbury, Mass.

Charlie Johnston writes that Mrs. Johnston is still very sick, with an ailment the doctors cannot seem to diagnose, but feels somewhat optimistic over a slight recent gain. Here's wishing them the best of luck and that they may strike a solution to confound the medics. Charlie writes that Roy Allen has left to spend some time in Cuba, working for the government at the large nickel plant built there during the war. Buenos something, Roy. Louis Robbe has arranged a series of photos taken at the 1946 reunion and has the group of pictures for sale at cost, as he did last year. Louis' address is Louis E. Robbe, 108 Hickory Grove Drive, Larchmont, N.Y. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 71 Newbury Street, Boston 16, Mass.

1907

Frank Clifford Stockwell, chairman of the department of electrical engineering and founder of the graduate school at Stevens Institute of Technology, Hoboken, N.J., died on December 29, at his home on the Stevens campus. Frank was graduated from Bates College in 1905 and received his degree in Electrical Engineering with our Class. He at once joined the Stevens faculty as a physics instructor and after a series of promotions became Anson Wood Burchard professor of electrical engineering in 1930. In that same year he organized an informal graduate school of 10 students who wanted to work for their master's degrees while they were serving at the college as instructors and had asked Frank to arrange classes for them. The school remained on an informal basis until 1938, meeting only during the day and averaging about 30 students. It was evident, however, that a real need existed for a night graduate school which would allow persons with jobs in the New York area to continue their studies, and the school was instituted under this plan in 1939 and now has about 525 students enrolled. Our classmate was appointed dean of the new school in 1939 but retired in 1944 because of the pressure of his outside activities, for he managed a part-time practice as consulting engineer, especially in communication networks, electric wave filters and electromagnetic devices. He was a specialist in legal actions and patent litigations as well as in engineering and did much work for the Empire Electric Brake Company of Hoboken. From 1913 to 1925, he was also chief instructor at the New York Edison's school in laboratory practices, then numbering about 2,500 students, and was its educational director from 1925 to 1932. In June, 1946, he was awarded an honorary degree of doctor of engineering from Stevens Institute. He was a member of the American Institute of Electrical Engineers, the Society for the Promotion of Engineering Education, the National Electric Light Association, and Phi Beta Kappa. He is survived by his wife, Mrs. Sarah Symonds Stockwell, and a daughter, Miss Mary L. Stockwell. I wrote a note of sympathy to them on behalf of the Class and have received a grateful acknowledgment.

A note from Bob Albro of 377 St. James Avenue, Springfield, Mass., says that "to

see the gang again in a few short months at our 40-year reunion, from June 20 to 22, is the top item in the 'March of Time'." Ernest Altgelt, consulting engineer, Route 8, Box 252, San Antonio 1, Texas, expresses his hope of being with us. — Albert L. Burwell is chemical engineer with the State of Oklahoma Geological Survey, his address being 610 North Crawford Street, Norman, Okla. — Fitch Harrison Haskell, who received his master's degree in '07 in Architecture, is employed in the office of Templeton Johnson, architect, in San Diego, Calif., his own address being 1171 Morada Place, Altadena, Calif. He reports the birth on July 16 of his first grandchild, the daughter of Julia Haskell Nixon. Another daughter received her degree of B.S. from Simmons College, Boston, last June. — Milton MacGregor finally retired from teaching in the Boston school system, at his own request, having made his last appearance at class on December 20. He is living in his recently acquired home, "Silvermead," Lower Road, Brewster, Mass. (on Cape Cod), where he has a small farm and cranberry bogs sufficient to give him 140 barrels of berries last fall.

Ed Marsh, who is deputy commissioner of the department of health of Westchester County, N.Y., at White Plains, wrote in January that he had had six years and five days of active duty in the United States Army as a colonel in the Medical Department. Being too old to go overseas, he was in charge of preventive medicine in the Second Service Command. He received his commendation ribbon and since retirement has been designated as honorary consultant in preventive medicine to the surgeon general. Ed says he hopes to be with us at Oyster Harbors, from June 20 to 22, only about three months ahead when you read this. We hope you, too, are making similar plans. As Harold Wonson puts it: "Leave your dignity at home and come with us." — Bryant Nichols, *Secretary*, 23 Leland Road, Whitinsville, Mass. Harold S. Wonson, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

The second dinner meeting of the Class for the 1946–1947 season was held in the Silver Room, Walker Memorial, M.I.T., on January 9. The change to Thursday from our usual Tuesday was not very successful as only the following turned out: Jefts Beede, Myron Davis, Sam Hatch, George Freethy, George Belcher, Joe Wattles, and Nick Carter. After one of Brother Bridges' excellent dinners, Joe Wattles showed some very fine Kodachromes which he took on a trip to the West Coast last summer. It's too bad more of the Class couldn't have seen them. Joe's trip, with his wife and son, included Yellowstone National Park, the three Utah state parks, Riverside, Los Angeles, Yosemite National Park, Sequoia National Park, San Francisco, Seattle, Victoria, Vancouver, Jasper National Park, Lake Louise, Banff, Fort William, Sault Ste Marie, Georgian Bay, and Toronto.

D. B. Myers has been retired from the Union Oil Company after 25 years of service and has now established a consulting office at 327 Bartlett Building, Los Angeles 14. He continues to live at his old residence, 686 Laloma Road, Pasadena 2. — Charlie Steese is still at Las Vegas, Nev. If any of you are out that way, look him up.

The following letter has been received from Holland R. Wemple of 75 East 45th Street, New York City: "I thought that you and members of the Class of 1908 would want to know of the death of my brother, Leland E. Wemple, on January 3 at his home in Waverly, Ill. He had had a heart attack toward the end of September in Chicago while en route from his home to Lordsburg, N.M., where he had interests in mining properties. He was president of the Southwestern Mineral Company, an organization active in mining in that district, which owned and operated a concentrating mill near Duncan, Ariz. He had been president of the Illinois Zinc Company, Chicago, Ill., with smelter at Peru, Ill., from 1923 to 1938, during which time the zinc company developed a zinc mine near Deming, N.M.

"He foresaw the desirability of transferring the zinc smelting industry to the Southwest, where natural gas offered cheap fuel and where supplies of zinc ore could be obtained from our southwestern domestic mines and possibly from Mexico. He built a plant near Amarillo, Texas, and had brought it into production shortly before his retirement from the presidency of the Illinois Zinc Company. Throughout his career he was interested in research and was the inventor of several chemical and metallurgical processes, which have been used both in this country and abroad.

"Leland entered Course V at Technology from Illinois College, Jacksonville, Ill., and soon thereafter took an active part in Institute affairs. He was on the football team of those days and a member of the Chemical Society and of the Phi Kappa Sigma Fraternity. Later, when the M.I.T. Nautical Association was formed, he contributed a boat to that organization. He is survived by his wife and two sons, Edward L. (M.I.T. '34), George B. (M.I.T. '37), and one daughter, Mrs. Richard V. Henry, Jr., as well as by his three brothers, Jay, Clarence, and myself, and one sister." — We are sorry to report also the death, on November 27, at Chicago, of Philip J. Hale.

The third dinner meeting of the season will be held on Tuesday, March 18, at 6:00 P.M. in the Silver Room, Walker Memorial, M.I.T. The usual notices will be mailed early in March. Make your plans to come and get acquainted. — H. Leston Carter, *Secretary*, 60 Batterymarch, Boston 10, Mass.

1909

The Class always welcomes a message from its President, Carl Gram, X, who is now swinging two real portal-to-portal jobs down in Pennsylvania — one with the Animal Trap Company at Lititz, and the other operating a farm as a real dirt farmer. He hails us in these words: "Classmates — Both Paul and Chet have been urging me to write to the Class through our news section in The Review on the basis that, as president, I should show some active interest in our flock of '09 men and not merely in our flocks here on the farm. Being a farmer isn't conducive to writing, especially when the farming is added on after long days at the office, and the writing added on after that. As I write, it is nearing midnight, and I have just come in from the barns after having taken a last look for the night at the livestock to see whether there are any new lambs, because lambing season has begun, and sometimes a little assistance to the lamb or its mother goes a long way. There were a rugged set of twins and a single. Ba-a-a-a! Ordinarily in this locality, lambs do not begin to arrive until late January and stretch along into March. We have always desired earlier lambs so that the market lambs will be of good size for the Easter market, and the (Hampshire) breeding stock will be well developed and of good mature size for the next season's shows and sales. As this is the first year that we have had new lambs before Christmas, we are all pepped up about it.

"In some respects I am not so pepped up about our flock of '09 men, because they haven't been producing contributions to the Alumni Fund to the extent that '09 is capable. Our showing, such as it is, comes from the old stand-bys who contribute regularly every year; but since now and then even a regular contributor may miss a year, we need some 'filler-ups.' The Alumni Office informs us that, as of November 30, our standing on amounts is only 71 per cent of quota and on the number of contributors, 91 per cent. So, with only a few weeks left, we need at least 11 more contributors, regardless of the amount. We certainly shall welcome some new names on the roster and also hope that this reminder will reach the few regulars who have not yet contributed this year.

"I hope that everyone in our Class realizes and appreciates the swell job that Chet Dawes is doing, collecting the news which comes to you so regularly in these columns. The Class is to be congratulated on having such a loyal worker as Chet for our Review Secretary; so give him some encouragement, and give the rest of us a glimpse of your old-age activities by sending in a bit of news about yourself. Greetings and best wishes to all of you for the New Year."

The Review Secretary thanks Carl for the compliment, but wishes to add his indebtedness to Paul, who is not only most active in keeping the New York group an organized and going concern, but whose regular contributions to the class notes make the Review Secretary's work so much the easier. For example, here is a note from him concerning Tom Desmond: "How well do you know your congressman? My own experience has been that, although I put myself out a bit to know our man here in Jersey, I have never felt any strong bond between him and one of his run-of-mine constituents. That may be why I often envy the Mex Weill family. As you know, Mex and Helen and even some of the family have lived in Port Jervis, which is in the district that Tom Desmond represents as state senator in New York State. And all I know is what I read in the papers. Every now and then in the society news, there is mention of Senator and Mrs. Thomas C. Desmond spending a few days at Mayfair House in the best part of Park Avenue and Manhattan. Moreover, the news columns tell of some measure that Tom is sponsoring. And all these measures are

good measures. An article in the *Times* of December 16 reports how Tom is urging the formation of a joint legislative committee — here I quote from the *Times* article — 'to develop means of salvaging the stability and the wisdom of the elderly.' Tom adds: 'The plight of the aged, in so far as unemployment, chronic disease and maladjustment are concerned, poses grave problems for our State.' As I think back, this seems to be a typical report of Tom's activities and his own outlook, and I think you'll join me in saying to Tom: More power to you!"

Further as to the Desmond family, Muriel sent a copy of Alice's *Glamorous Dolly Madison* as a Christmas remembrance to a classmate who is librarian at the London, Ontario, public library. Word has been received not only of the librarian's interest in the book but also of the fact that she knew the author well by reputation since her children's books were in the library and in continual demand.

Molly Scharff explains his failure to contribute any notes as follows: "I have been tied up continuously since early in December on the arbitration of the issues arising out of the Duquesne Light Company strike last September and October. I am serving as industry member of the board of arbitration and having an interesting experience with the president of the union as the labor member of the board, and a third member appointed by the Secretary of Labor. I had occasion to talk on the telephone the other day with Royce Gilbert and learned that he is now actively engaged with a large construction company with headquarters in Dallas, Pa."

We have already told of Charlie Johnson, IV, and his recent connection with the University of Maine at Brunswick, Maine. We have recently received other news clippings concerning Charlie and his family. At a recent meeting of the Putnam Valley (New York) town board, it was recommended to the board of trustees of the library that the name be changed to the Rhea Kimberley Johnson Library in honor of the late Mrs. Johnson who founded the library and was its first librarian. On her death, Charlie succeeded to the position of librarian until the war called him to the Brunswick airport. (Putnam Valley is not far from the Desmond home.)

Also, Mrs. Lola B. Wright Wood of Boston has announced the engagement of her daughter, Louisa Joyce Ashton, to Kimberley Johnson, Charlie's son, who is now a senior at Northeastern. The Review Secretary and Muriel had the pleasure of a visit at their home on Christmas evening from Charlie, Kimberley, and Louisa. We were able to show colored movies of our trips and cruises along the Maine Coast, including a visit to the Pearl House on Orr's Island, owned by Charlie's sister. We regret to report that Charlie's older sister, Lilly, died suddenly in December, but fortunately his younger sister continues to live in the Pearl House, and it will still be open to visitors. — Paul M. Wiswall, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. Chester L. Dawes, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries:* Maurice R. Scharff, 285 Madison Avenue, New York 17, N.Y.; George E. Wallis, 1606 Hinman Avenue, Evanston, Ill.

1910

On December 15, my business partner, Edward A. Varney, passed away quite suddenly. His death was a very severe loss to my firm, and his place will be difficult to fill. My other partner, Waldo F. Pike '15, and I will carry on under the name of Cleverdon, Varney and Pike.

George McRae received a War Department citation for services during the war. The following is from the Newark *News* of October 31: "A War Department certificate of appreciation was presented George W. McRae, vice president and general manager of the New Jersey Bell Telephone Co. at a luncheon today attended by 160 executives of the Company at Robert Treat Hotel. The citation 'for patriotic service in a position of trust and responsibility' for McRae's work during the war years bore the signature of Secretary of War Patterson and Maj. Gen. H. C. Ingles, chief signal officer. It was presented by Col. Grant A. Williams, signal officer of the First Army. The War Department specifically praised McRae for providing critically needed telephone facilities for military use in the territory of his company within prescribed time limits, despite numerous difficult problems."

Walter Spalding is located in Honolulu and writes that he is very busy, happy, healthy, and prosperous enough to be building a home on a 900-foot ridge overlooking Honolulu. Walt is now manager of the Hawaii Branch of the McNeil Construction Co. — Martin S. Tod, the last contributor to the Hadji-Savva relief, writes from Youngstown, Ohio, and sends his best regards to all classmates. — Occasionally, I hear indirectly from George Maglott. He is living in Wrentham, Mass., and has a family of five girls and two boys. He is working for the Brown and Sharpe Manufacturing Company in Providence, R.I. — The Brookline *Citizen* of January 2 has given Dean Peabody's twin daughters, Ruth and Nancy, a very fine write-up. Ruth is assistant to Dr. Joseph Melnick of Yale, aiding him in the use of a powerful electron microscope. Nancy spent the summer in Europe, where she has been serving with the American Youth Hostel work project. — Herbert S. Cleverdon, *Secretary*, 120 Tremont Street, Boston 8, Mass.

1911

Chalk up another triumph for General George Kenney, I, for the "unification" plan he has so long and so vociferously favored is well on its way to consummation, as announced by President Truman in mid-January!

Our hearts go out to Jim Duffy, VI, and his fine family in the death of Mildred, wife and mother, in mid-December. We all have so enjoyed her at the reunions that she will be sorely missed, and to have been entertained at their Oak Park, Ill., home was a never-to-be-forgotten experience. — Word reached the Alumni Office at the turn of the year of the death on December 24 of Rafael A. Beckmann, III, at his home in Parral, Chihuahua, Mexico. No details are available.

Nineteen members of the Class gathered at the Advertising Club of New York, on Wednesday noon, January 15, at a lunch in honor of ye Class Secretary, who was in New York attending the Dry Goods Show and annual convention of the National Association of Retail Secretaries. President Stevens, II, organized this third successive January luncheon of 1911 men in the metropolitan area, and this year's hard-working committee, headed by Phil Caldwell, I, and including Dick Gould, XI, and Harry Tisdale, V, worked diligently and came up with the best attendance to date.

Phil started the talkaround by reporting that he is connected with the New York office of the Robertson Paper Box Company, manufacturers of paperboard and folding paper boxes, with the main factory in Connecticut, just outside New London. Dick is director of engineering and architecture of New York City's department of public works, which embraces sewage disposal, bridges, hospitals, in fact all public buildings. Harry is still with the American Dyewood Company, makers of natural dyewoods and synthetic aniline colors.

It was Walter Welch, VI, a member of the Advertising Club, who made it possible for the luncheon — the first scheduled function since the club's reopening after the complete renovation which followed a disastrous fire about a year ago. Walter has completed 30 years with the Combustion Engineering Company, the last five years of it as office manager. During the war the company was specializing almost completely in marine work but now is back largely in the field of public utilities service.

Don proudly reported completing 25 years with Okonite and was particularly pleased that in that quarter-century he had had no labor troubles. Once again he expressed his regrets at being unable to be with us at the reunion last June, but said his doctors had worked wonders on him by the enforced three months away from work. He also put in a good word for the new setup of the New York club, arrangements having been completed with the Architectural League at 115 East 40th Street for a Technology table at lunch daily.

Royal Barton, VI, continues as rate consultant for Ebasco Services, a subsidiary of the Electric Bond and Share Company. Jim Campbell, I, of Eadie, Freund and Campbell, consulting engineers, said that his good old firm continues to pursue general engineering. Lester Cushman, IV, the "royal chef" of Tech Show days, said he had remained in architectural engineering through the years, having for some time now been engaged in consulting work for Westinghouse in the manufacture of export power plants.

Charlie Edwards, XIII, has been for a considerable time with Pan American Airways in the general traffic office, while Liv Ferris, VI, continues with the Bell Telephone Laboratories. Joe Gershberg, VI, is with the Consolidated Edison Company of New York, with headquarters in Brooklyn, while Joe Harrington, VI, is with the Emjay Company, formerly the Standard Alcohol Company — the marketing company of Standard Oil of New Jersey. Joe said he believed that the petroleum industry is rapidly opening up new vistas in the field of chemistry and chemical engineering. Bob Haslam, X, Esso Vice-president, regretted his absence from the city on that particular day, which alone prevented his attendance.

It was a sight for sore eyes to see Mert Hopkins, I, an old associate on *The Tech*, who had come from Old Greenwich, Conn. He said he had run the gamut of engineering through the years, but now for some time has been in the management end of Fraser-Brace Engineering Company, building constructors. Another first timer was Norm Lougee, VI, for many years with Stone and Webster in Boston and New York, but recently and still with the J. H. Manning and Company, engineers. Bob Morse, VI, continues with the American Gas and Electric Company.

It was our good fortune to have Dick Ranger, VIII, with us after what he described as "five years of additional schooling in the Army" — for Lieutenant Colonel Ranger had been discharged from service but a month previously. He is back in Newark and is operating Rangertone, Inc., on advanced lines, currently starting manufacture of quarter-inch magnetic tape for permanent recordings.

In deference to popular demand, Dick spoke at length on his very interesting postwar work, ever since V-J Day, with the occupational forces on a special assignment in the field of communications. He said that Germany has much to offer us in the color photography field. In fact, they have a single-operation filming process quite different from Technicolor. He also urged us to take with a grain of salt criticisms of the work of the Army Occupation Forces in Germany: he believes things are going well in our zone. While abroad, Dick learned to speak French and German and even "a little Russian," and in this latter connection he thought things were also not so black as painted.

Frank Russell, II, continues in real estate with Horn and Burke in Manhattan, while Johnny Scoville, IV, commutes from West Hartford, so to speak, as he continues association with Sanderson and Porter in architectural engineering. The 19th man present was another first-timer, Isidore Spector, I, of the insurance firm, Spector and Chertoff, Inc. He enlivened things with some stories from the United Nations field.

It was with particular pride that I was able to report that 1911 is "right up there" again in Alumni Fund VII, for at the close of 1946 we had 141 subscribers (117 per cent of quota) for $5,335.50 (191 per cent of quota), making us third in each classification.

Beardsley Lawrence, I, wrote from the Baker Memorial (Massachusetts General) Hospital, Boston: "If I were in New York, I should certainly try to be present at the luncheon but unfortunately am at this address instead, having been laid up since last January." Selly Seligman, III, Zeke Williams, XI, and Rufe Zimmerman, IX, also regretted being out of the city at that time and thus unable to attend as hoped.

As usual, Sara and I were well remembered by classmates in Christmas cards, with the Nat Seeley, II, family group a high spot, as always. Roy and Ina MacPherson's 24-piece crossword puzzle, featuring their new home at 81 Warren Road, Framingham, Mass., was most novel, as were Tom and Mildred Haines's "To Tom Haines Playhouse" and Ted and Helen van Tassel's new Cohasset home cards. It was also very heartening to hear from Mary (Mrs. Charles M.) Barker, 3139 Eton Avenue, Berkeley 5, Calif., that her two boys are progressing splendidly: "Charles is back at the University of California majoring in electrical engineering and hoping to have some time at M.I.T., while Tommy is a high school senior."

Speaking of youngsters, Cac Clarke, 1921's fine Secretary, sent me a clipping from an early January issue of the Newark *News*, headed, "Composer-Grandad," and telling of the christening of the eighth grandchild of Bill Orchard, XI, and his wife, residents of Maplewood, N.J. "During the supper that followed," the clipping reports, "Granddad Bill, who is a man of musical notes as well as civic and industrial note, sat down at the piano and played one of his own compositions entitled 'Robert John' in the baby's honor. Adapted for performance on either the piano, organ, or accordion, it's a tuneful companion piece to the one he composed and named for Ann Marie, now 23 months old."

Paul Cushman, VI, was installed as high priest of the Valparaiso, Ind., Masonic chapter in early January. And speaking of Course VI, we of that course certainly learned with regret of the death of Professor Harrison W. Smith '97, well-remembered as Hot Wire Smith, among the Faculty of our day.

For the housewife it's nearly spring-cleaning time, but for the loyal classmate it's time to "write to Dennie!" — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

1912

We hope that definite plans for our 35th reunion will be in your hands before you read this. We are depending on you to get back to Boston, as it has been a long while since we have been together, and you may be sure of a good time and will always regret it if you are not there.

Charles A. Cary, assistant general manager of the Du Pont Company's nylon division, has been elected to membership on the board of directors and also made a vice-president of the company. Cary joined the Du Pont Company in 1918, at their black powder plant. After serving successfully as assistant superintendent of several of the company's explosives plants, he became superintendent of the Connable Works at Birmingham, Ala., in 1923. In 1925, he transferred to the Du Pont Rayon Company, now the rayon department. He became assistant manager of the nylon division in 1940 and manager in 1944. A year later he was made assistant general manager of the department.

Paul McI. Tyler, for many years with the Bureau of Mines, returned from Europe last spring. After completing his reports covering investigations on metals and minerals in Germany for the Department of Commerce, he resigned from government service. At present he is executive officer at the M.I.T. Metallurgical Laboratories, Watertown Arsenal, Watertown, Mass.

N. M. Katsainos is now chief engineer with the Athens Piraeus Electricity Company, Ltd., Kerai Street, Athens. He reports that he suffered with other Greeks for nearly four years under the cruel and ruthless enemy occupation when hunger and unbearable misery were their lot under the Axis yoke, and the Axis powers encouraged the germs of anarchy and disorder to complete the destruction of his country. He had personal experience of the new ideas the Bulgarians, Italians, and Germans planted in his country, as ignorant people tried to assassinate him, but he was fortunate enough to get away with two flesh wounds. During the 1944 December rebellion he was held by the Communists as a hostage for more than a month and had to travel on foot over mountainous country and rough going.

Harold R. L. Fox, general manager of the Jamaica Government Railway, writes that, because of restriction of truck traffic over the road, the war business of the railroad went up some 400 or 500 per cent, but now that the war is over, the railroad traffic is falling off. Formerly, the railway had considerable banana business, but the banana industry in Jamaica has been largely wiped out by disease. There seems to be some possibility of traffic in handling the newly discovered bauxite deposits in Jamaica. Fox writes that his son was graduated from McGill University in civil engineering. He had joined the Canadian Corps of Engineers during the war and reached the rank of lieutenant. He was demobilized last September.

Have you contributed to the Alumni Fund? If not, now is the time to do it. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown 72, Mass.

1913

To any of you who are still procrastinating in the matter of contribution to the Alumni Fund, this is a reminder and a request that you do all that you can to help. Without going into statistics, the simple fact is that our performance does not compare favorably with that of our neighboring classes. The time for planning our 35th year reunion has come. Along with your impending bill for class dues, you will be asked for suggestions, such as how, how much, and where to celebrate in June, 1948. So please put this matter in the back of your mind immediately.

Frank Achard, VI, has opened an office at 755 Boylston Street, Boston, as consultant on personnel management problems. If you have personnel problems, I can strongly recommend Frank to you, and urge that you surely write to him for his two cards: (1) "Fields in which we can assist you," and (2) "How we operate to assist you." Both are impressive; and totally unlike many management consultants formerly efficiency engineers, Frank indulges in no pressure selling.

A granddaughter was born to Burton Cushing, II, on December 4. Burton is master of the science department at the East Boston high school. — It was only last December that I learned of the death of two classmates. Al Ranney, I, died on May 27, 1944, and Oliver R. Hayes, V, on October 28, 1945. Over a period of 10 years, I have written to Al Ranney several times and have never got a reply. I never could understand it, for Al was a colorful, personable, likable classmate. A good mixer, he took part in many school and class activities. — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 788, Pawtucket, R.I.

1914

A fine letter was received recently from Dave Sutherland. He is now back in Minneapolis after a long war service, ending as a colonel. During the earlier part of his service, Dave was at the Materiel Center at Wright Field in the experimental engineering section, moving from there to the development engineering branch of the Materiel Division of the Army Air Forces at the Pentagon, and finally being sent with the Eighth Air Force to Europe. This traveling around seems to have become a part of Dave's make-up: he writes that he is leaving by air from Denver on February 10 for a two months' trip with Pan American to Mexico, Guatemala, and South America. But he will be back in plenty of time to attend Alumni Day at the Institute on June 14 and then the following day go to Williamstown for his 35th reunion at Williams College. He is planning to return thence to Minneapolis for a few days and will then fly to England and France, being away about a month. After that he is hopeful of staying in Minneapolis for a while, but your Secretary would not take any bets on this. Between all this traveling, he intends to walk down the aisle on May 7 to give his daughter in marriage to Chauncey A. Kemp, Jr., of Wickenburg, Ariz. It is no wonder that Dave treasures his automobile license number, which, he says, is 3385 and stands for the fact that he feels about 33 and expects to live to be 85.

Freddy Karns, who was in the greater Washington area in charge of one of the Red Cross projects during a good part of the war, has returned to Franklin, Pa.; but instead of going back into the transportation business, he has joined the Pennsylvania department of highways and, to use his own words, is "building the best d — roads in the world." Your Secretary interprets the missing letters to be "i-r-t." — Jack Wood, Brigadier General, U.S.A., has been awarded the Silver Star and the Legion of Merit. It will be recalled that Jack obtained considerable fame early in the war for his very effective training of colored troops. — At last Lucian Burnham has been able to settle down in that house he bought in Pasadena. On December 1, he was discharged from the Marine Corps. Burnham wrote that now all he has to do is sit on the porch in the warm California sunshine and enjoy life, but that so far the sun had been turned off and the fog so thick he could hardly see beyond the porch railing.

Lester Forbes has returned to Boston. He has spent nearly all his time since graduation with the Submarine Signal Company, first in Boston, and then for many years in France. He left Paris by the back door just as the Germans were coming in the front door and on returning to this country was assigned the managership of the Submarine Signal Company's New York office. That company was recently absorbed by the Raytheon Company, and Forbes is now back with the Submarine Signal division at their Boston office and is again associated with foreign sales. — Harold B. Richmond, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass.; Charles P. Fiske, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

1915

That splendid wedding gift to us came from 93 of my classmates, including Barbara and Virginia Thomas, who made a contribution to the fund in addition to the time they put in on the committee and on the colossal job of editing and preparing all your letters for the notes. Again, from Frances and me, many, many thanks. Here follow more of the interesting and amusing letters.

To Barbara Thomas from Jerry Coldwell, 8 Brooklands, Bronxville 8, New York: "It is with considerable pleasure that I enclose my check in answer to your letter covering Azel W. Mack's approaching wedding. I have seen Azel many times here in New York in the last 30 years, and I certainly wish him the best of luck on his new venture. . . . Incidentally, although I have never met you personally, I knew Howard very well when we were both struggling students at the Institute and sometime or other I am going to look you up and at least say hello. . . . I have two boys whom I am trying to get into Tech in the fall of 1947, and it may be that in the future I shall have to be in Cambridge a little more frequently. If so, I shall have more of a chance than in the past to look up a few people. My work takes me all over the United States but very seldom into New England."

Allen Abrams, Rothschild, Wis., writes: "Here is my little contribution to the Mr. and Mrs. Azel fund, with my hearty congratulations and best wishes to them both." — William Mellema wrote: "I am very appreciative of what Azel has been doing all these years for the Class!" Bill is at 1663 Beverly Boulevard, Los Angeles 26, Calif. — From Ray Stringfield, 229 South Normandie Avenue, Los Angeles 4, Calif. "Poor old Azel! As we get older, our resistance finally gives out. Or is it that some people are just more conservative than others and want to watch for a few (?) years to see how the rest get along?"

From George Rooney of 14 Pelham Street, Cambridge, Mass.: "Enclosed is a check toward a present for '15's most eligible bachelor. . . . Tell him that when I make my first million, I will make up by building that 'dream house' for him and Frances. . . . Best of luck to you and Virginia, and come over and visit the Rooneys when you get a chance." — Gilbert L. Peakes, 276 Grove Avenue, Metuchen, N.J., sends this: "Here I am joining the throng who honor Azel for his courage in getting married at this late date, and for other things. . . . Of course, I don't wish Azel any bad luck, but I hope somebody else is late too, so that my check won't be the only straggler . . . I wish him most heartily a long and happy married life."

Dozens of Christmas cards from our classmates all over the country brought much cheer to Frances and me at the holidays. And if we missed any of you with our cards, all the best from us to you and your families. All this and turkey, too, for on Christmas Eve we received a 19-pound turkey from Ben Lassen. Thanks, Ben, for your generous gift. It presented a Course II problem in getting it in and out of our oven, but with it we finally fed a multitude and had baskets left over for turkey soup later in the week!

San Willis, recuperating near Boston, has recovered from his recent thrombosis attack sufficiently to prepare to return to St. Louis in February. We're surely all glad to hear that good news and wish San continued, steady improvement to a complete recovery. — John Dalton X, has recently been elected a national vice-president of the American Association of Textile Chemists and Colorists, a position of honor John richly deserves for his services to the association as a charter member since its organization in 1921. Congratulations, John! — On August 14, at the regular monthly meeting of the Scituate, Mass., Forum, Ed Goodell spoke on the "United Nations — Background and Future." Ed is chairman of the United Nations Association of Boston. In 1915 his thesis was a proposal for a world peace pact. His address is Concord Road, Wayland, Mass.

Here follow two letters to end all letters — amusing, interesting, flattering, and sincere. Since nowhere among their florid adjectives do I see "modest," I shall bow deeply and blushingly to accept all this acclaim. The first is a note from Tower Piza, 170 Lexington Ave., New York City 16, which reads: "Enclosed is my offering to aid in marking the momentous occasion. I wish my contribution could be more commensurate with the debt that I owe and the glow I feel . . . Give the hotheaded young man a good thump on his most vulnerable bottom for me and tell him he should not shock us by rushing impetuously into decisions before any of us have recovered from our surprise! . . . My congratulations to the committee for their fine work. I hope the result is simply staggering. It should be."

And then we hear from Parry Keller, 105 Fir Hill, Akron 4, Ohio: "The enclosed communication in regard to the latest (or coming) episode in the young life of our esteemed, personable, human, diplomatic, patient, obliging, convincing, useful, dependable, likable, diligent, hard-working, faithful, loyal, smart, intelligent, and frequently abused Class Secretary has just come to my attention. Barbara, I hope it is not too late for you to cut me in on the deal. . . . I was always of the opinion that Azel would come to it sooner or later. What really amazes me is that he needed so much time to sell Frances his bill of goods. We shall have to admit that a lot of his classmates have worked a lot faster than he has . . . He certainly needs help now and from all of us. Judging from the size of the committee listed at the foot of the appeal for help for Azel, Frances should get a good start toward success. . . . Please present my sincerest greetings and best wishes to Azel and his bride. To you, Barbara, sincere greetings from one Fifteen member to another."

Many thanks to you all. I proudly take a deep and blushing bow to acknowledge all your plaudits and all you've done to "help Azel" and Frances. — Azel W. Mack, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1916

Apparently a pre-spring thaw has set in, for the news of this Class has poured in — a slight exaggeration. But we are now hopefully awaiting a complete inundation.

The news of W. H. Fleming's service

with Goodyear in Akron was sent in by Ed Weissbach and Phil Hulburd '17. The clipping reads as follows: "Three decades of Goodyear service has been reached by W. H. 'Flip' Fleming, manager of general merchandise and material control. He was presented his 'Triple-X' pin last week by President E. J. Thomas at a council luncheon." The article gives a synopsis of Flip's career, beginning with his pre-Tech work of 1912 through his present position. He is responsible for "the proper control of overall commitments and inventories of raw materials, and the distribution of the finished products." Ed's note went on to say: "My daughter is a junior at Hood College, and the freshman assigned to her is the daughter of C. N. Jacobs '15, X — small world after all. Here at Campbell Soups we have had the misfortune to lose our President, Arthur C. Dorrance '14. Everyone in our Class probably remembers him as Buck Dorrance, one of our freshman organizers. The new president is also a Tech man, James McGowan, Jr., '08." With Phil's letter came best wishes and an understanding observation on the difficulties secretaries have in obtaining material.

From the Johns-Manville Corporation we received a recent release on James Evans of Paterson, N.J. Jim was inducted into the Quarter Century Club, honorary organization of Johns-Manville Corporation for those who have been associated with the company for 25 years or more. Jim, who is Johns-Manville Industrial Products representative with headquarters in Newark, N.J., was presented a gold watch at the induction ceremony held at the Building Trades Employers Association in New York City.

A letter from Jim Murdough in Texas reads: "I am still enjoying my place here at Texas Technological College, having been here for 21 years now. My boy has grown up, been in the Army for three years, seen overseas duty as an Engineer officer, and is now out working on construction in Minnesota."

Jack Heller of Gasair Corporation, 582 Market Street, San Francisco, sent a long letter, which was very welcome, as we had not heard from him in many years. He writes as follows: "I left Montana in 1926 and came to San Francisco, where I worked awhile for the Coast Counties Gas and Electric Company at Santa Cruz, Calif., and then for a short while with the Loveland Engineers here. After that, I was in the San Francisco office of Ford, Bacon and Davis until the office closed. While there, I became acquainted with the gas business. At that time the Standard Oil Company of California, through subsidiaries, was building 29 butane-air town supply gas plants. They were using a system whereby they bled the butane vapor down to almost atmospheric pressure through regulators and then sucked it, along with the proper proportion of diluting air, into the intake of a compressor, for which they bought electric power. The whole thing looked screwy to me. The butane in liquid form in the storage tanks was under pounds and pounds of pressure depending on the tank temperature, and to me pressure always was synonymous with energy. I made some calculations and concluded there was enough power available in the butane to draw in the necessary air and put the mixture out at a reasonable gas distribution pressure of a couple of pounds. Later I built a machine incorporating the ideas I had figured out and tried it out. A friend of mine who had a small gas property in Arizona saw the rig and borrowed it to try, and then he bought four more of them. It was not clear sailing, because bugs developed, and it really took about 10 years to get them all cured. But finally the thing clicked. The Eaton Metal Products Company of Denver has the manufacturing rights; the Pacific Gas Corporation has the sales rights east of the Mississippi, and the California Maine Corporation, west of the river. I am living here on Telegraph Hill — a beautiful place to live. Come out some time. Give my best regards to everyone I know."

A recent clipping from the Boston *Post* mentions the departure of the Rev. and Mrs. Raymond B. Blakney for China, where they will serve under the American Board of Foreign Missions in Peiping, North China. Reverend Blakney served as an Army chaplain in World Wars I and II, spent from 1920 to 1927 in China as an educational missionary, and has held pastorates in Sanford, Maine, and Williamstown, Mass.

Another newspaper headline of interest to this Class was the notice of the award of the Hoover Medal for 1946 to Vannevar Bush, President of the Carnegie Institute of Washington. This recognition is one of the outstanding honors of the engineering profession. Dr. Bush was the wartime director of the Office of Scientific Research and Development, and the citation accompanying the award designated him as an "engineer, educator and administrator who, in the critical time of need, was in most special sense an organizer, guiding spirit, and driving force of the nation's achievements in physical and medical science." We of 1916 are proud of Dr. Bush's splendid achievements.

Jap Carr of the 221 million "cracking good" pounds of Carr-Consolidated biscuits, sends us an interesting letter: "Aside from business affairs, which you previously covered, I am trying to keep up with my tennis, which also tends to keep down my waistline. We have been spending quite a bit of time at Buck Hill Falls in the Poconos and have been able to get to Florida for a good portion of the last three or four winters. My oldest boy is now 13 and is scheduled for Exeter next year, with the present intention of entering Technology four years later. My other boy is now only eight and plans for him are very much undeveloped. Having two boys, however, has caused me to devote some time to education, including a membership on the board of trustees of Bucknell Junior College, here at Wilkes-Barre, and the presidency of the board of trustees of the Wilkes-Barre Day School." Jap, by the way, is the sponsor of a Monday, Wednesday, and Friday night program heard over WBZ in the Boston area.

Earl Mellen sends along the following report of his whereabouts: "My position here at the Weston Corporation, of which I am executive vice-president and treasurer, remains the same, although it is accompanied by gradually increasing responsibilities, or so it seems, amid all the problems that go with the operation of a business these days. My three oldest boys, who were in the service, have returned and are now at college. Earl, Jr., who was a junior grade lieutenant in the Navy, is back at Virginia Polytechnic Institute in Virginia; Howard, who was in the Army as a swimming instructor at Fort Ord, Calif., is now at Lafayette; Ralph, who was an ensign in the Navy, is at Lehigh. Earl was a pilot of a four-engine bomber for the Navy and saw considerable action in the Philippines and the South China Sea. My youngest boy, Walter Roy, fortunately did not attain a draft age and was able to enroll at M.I.T. He is now in the second half of his second year. Besides the four boys, I have two girls, ages 12 and 10, who are growing up very fast. As a side issue during the past few years, I have participated in civic activities to a considerable degree as president of the Newark Chamber of Commerce and later of the Welfare Federation of Newark. These activities, however, have taken more time than it has been possible for me to spare continuously from the business of the Weston Corporation, and I am therefore rather glad that although I am still on the boards of both organizations, my executive responsibilities no longer apply. I have become quite interested in golf and am still hoping that by constant practice I can make a reasonably low score."

The following letter brings us up to date on Bill Drummey: "I am back in private practice after having been a pampered pet of a doting government — including a 22-month stretch as a major of Engineers with 18 months overseas as well as being a department head, Federal and Municipal, for some 13 years. It's good to be a private citizen again. Through misfortune my family has dwindled to one son — a twice decorated sergeant of Marines — who is a sophomore at Holy Cross. He says he wants no part in architecture: maybe he's the wise one. I first went into business for myself at this address in 1923, and while I can still function, I'm going to stay with the practice of architecture, which has not been too bad by any means. My two problems of the day are (1) keeping my figure (I have a slight case of fallen arches — in the chest!) and (2) not yet using bluing on my hair. It is always good to hear from you."

Frank Hastie has now moved to Takoma Park, Md., and from there he sends us the following data on himself: "Last fall I found myself a cottage and this year had my first Christmas at home since 1941 — with all present (Mrs. Hastie, Cora, Frank, Jr., Cornelius, and Clem — also Dick, my son-in-law) except John, who is a second lieutenant in the Corps of Engineers, stationed near Tokyo. He was graduated from West Point in 1945. A pleasant time was had by all. Cornelius is a senior at Exeter and Clem a lower middler at Andover. Frank, Jr., is employed by the Washington branch of Time, Inc. In October 1941, I went back on active duty and served in Panama (or rather, the Caribbean area generally) and at various locations in the United States, and finished up over in the Pacific area — mainly at Schofield Barracks. For the first eight months in 1944, I had a General Service Regiment (colored) and enjoyed that service more than any other assignment. We had a good outfit. Now I am back in the office of the Chief

of Engineers, keeping busy mainly on administrative work connected with the Veterans Administration hospital construction program, the bulk of which, as you know, has been assigned to the Corps of Engineers for execution. My hobbies are bridge and bowling — both calculated to deflate my ego. You recall what old Bill Shakespeare said — "Strange how desire doth outrun performance." Every time I play bridge or bowl I am reminded. I was sorry to miss the reunion last summer but hope to be in on the next one. During the next five years I shall try to keep young and enjoy watching my children's progress."

Arvin Page stopped between flights to drop us the following note, "I have a few minutes while waiting for plane time in which to jot down a few lines that I hope you can decipher. When I last reported, I was chief engineer of the Bahnson Company at Winston Salem, N.C., and I still am. We design and install industrial air-conditioning systems. Most of our work is in the textile industry, although we do stray into other pastures now and then. Our shop is relatively small, employing about 200 men, but we have a rather wide range of equipment. During the war we obtained enough priorities to run at about half speed on our regular line of work, and I had the job of digging up suitable war work to keep the plant busy. This required a certain amount of traveling, during which I made contact with several of the boys, most of whom showed up at Osterville in June. The only exceptions I can think of were Moose Jewett and Obie Pyle. I saw Moose in Buffalo about two years ago. He is with Spencer Kellogg and has charge of their oil manufacturing plants. He makes castor oil, linseed oil, coconut oil, and when the occasion demands, he can produce banana oil. Obie Pyle is the star salesman of the Brown Instrument Company in Philadelphia. My wife and I stopped at Obie's on the way home from Osterville to bawl him out for not showing up at the reunion. He was very penitent and swore that he would never miss another. He may not remember making that statement, but I do, and I have witnesses. I do not do very much these days except work and play golf. Someday I am going to talk Frank Ross into giving me a reasonable handicap, maybe 16 or 18 strokes, and then give him a trimming. I'll be laying for him in '51. . . . It's now time for the bus to leave for the airport." And time for your Secretaries to sign off. — RALPH A. FLETCHER, *Secretary*, P.O. Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

1917

The following from the Boston *Herald* of December 31 tells of the current activities of one of our well-known local members: "The appointment of Lucius T. Hill of Brookline as director of housing of the John Hancock Mutual Life Insurance Company was announced yesterday by President Paul F. Clark. His duties will include supervision of Hancock Village, the company's first housing project in Brookline and West Roxbury, and development of other housing sites throughout the country. He is a graduate of . . . Technology and a veteran of the first World War. In 1943 he resigned as vice president of a Springfield war plant to devote his time to war bond activities, serving as executive vice president, U. S. Treasury War Finance Committee. He was formerly a partner in Loomis-Sayles & Company and general merchandise manager of the Flintkote Company. He is a trustee of the Bond Investment Trust of America; a corporator of the Boston Five Cents Savings Bank and Franklin Savings Bank, and a director of the Northern Railroad and other enterprises."

Announcement comes to us of the marriage of Alvah Moody's daughter Eleanor to Donald W. Ickes, grandson of the former Secretary of the Interior. Besides having this new member in his family, Peso is now a grandfather, as his daughter Marcia in Colorado Springs had a daughter last July. His son Elbridge is out of the Air Forces and now a forestry student at Iowa State College. Peso writes that he is living alone now in Wilmette, Ill., and that once in a while he sees Frank Peacock, who works for a firm of consulting engineers in the hydraulic field.

It was good to hear at Christmas from Ras Senter in Texas and learn that he is trying to make plans to come to our 30th reunion. That June sixth week end at Portsmouth is drawing ever closer, and we look forward to a special celebration.

Again from the Midwest comes the news that Charles T. Ellis has been appointed to direct all purchases of paint, paint raw materials, petroleum products, pigments, and oils for the Ford Motor Company. Formerly he was factory manager of the Acme White Lead and Color Works in Detroit. Ellis is a member of the Detroit Engineering Society, the National Paint, Oil and Varnish Manufacturers Association, and the Detroit Athletic Club. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

Over an amazing range of years almost anything can happen to a man. The three events usually chronicled in connection with "this mortal coil" are birth, marriage, and death. The first has strict limitations concerning the age at which it can happen to the individual himself, yet it is possible for the peripheral individuals to gaze with delight and wonder at their achievement over quite an age range. Take Don Merrill, for example. As previously reported in these columns, he became a father for the fourth time not so long ago. Item two was marriage. Perhaps in any culture a happy marriage is the apex of fine and jubilant things. Certainly in our civilization, where the earth carries so great a burden of grief around the sun, it is cause enough for full-throated hallelujahs. So shake the melancholy out of your old midriff now and tender congratulations to Jack Hanley on being a groom. Life does not always touch zenith in one's youth. Sometimes we have to live a long time, and perhaps even suffer a great deal, to find deep and abiding happiness.

Item three was death. That, too, reaches out to touch us, this time calling softly but with utter finality the name of Harold D. Kilgore. On December 9 he suffered a heart attack and died at his home in Winthrop after having been employed as a civil engineer by the Commonwealth of Massachusetts since 1923. His last assignment was as superintendent of maintenance and distribution for the Metropolitan District Commission Water Division. Harold was also the historian of the Dustin-Duston Family Association and sometimes raked up the past as a genealogist. He is survived by his wife, Marion Bishop Kilgore, a daughter, and three sons.

If the crowning deterrent against the unnecessary death caused by war were frightfulness, then we could feel encouraged and renewed. The atom bomb is frightful enough, but informed people know that the scientists have even worse weapons in preparation. They go about it as though it were mostly dull and prosy stuff. Certainly there is no demoniac glee about them. They leave that to the politicians who use the weapons in the hope of grasping the world by the tail. The scientists themselves are mostly gentle men who would not — if left to themselves — add tinder to international arguments. Take Frederick Norton (usually known as Ted) for instance. He worked on some phase of the atomic bomb, snugly hidden in a far corner of the second floor of the Necco factory. And yet when he does what he wants to do he raises sheep. Somehow what happens to the sheep is disturbingly symbolic. In summer Ted builds a lean-to of poles, spaced a foot or so apart, and facing south, of course. Then, in his usual methodical way, he piles hay on the poles, making a snug, weather-tight protection for his sheep. These gentle creatures, seeking protection from the wintry blast, yet never suspecting the consequences of their own acts, gradually eat their roof away by pulling the hay out between the poles. Fortunately for them, Ted knows from his slide rule precisely how many loads of hay per sheep are needed to last until spring. Have the human sheep, who, exactly 967 times since 500 B.C., have unsuccessfully sought protection from war in a roof of military preparedness,any reasonable hope of not pulling it down on themselves again? How many scientists did we have to kill before we learned that oxygen and hydrogen always exploded in the presence of a flame? How many more wars will we fight before we learn that universal military training (to name one thing) always leads to war? — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Christmas greetings were sent by the Donald W. Kitchins from 50 Hastings Street, Wellesley Hills, including their sons Charles, Bob, and Don, Jr., and their grandson, Bob, Jr., born on September 12. Best wishes were also received from J. H. Kaiser of 208 Wellesley Road, Syracuse 7, N.Y. A brief message of "No change or comments" came from Leslie A. Jackson at 1600 Gaines Street, Little Rock, Ark. Samuel Heyman writes as follows: "Unless something happens between now and February 5, I am sailing with my family on the S.S. *Saturnia* for Egypt and Palestine. We are returning by way of London and expect to visit relatives in Copenhagen. The trip will take about three months."

Charles J. Farist of Main Street, Cheshire, Conn., says, "Nothing new. I'm still making ladies' dress buttons here in Cheshire." J. J. Falkenberg of 511 Forest Street, Denver 7, Colo., sends his best to the Class.

L. J. Grayson, a lieutenant colonel, has now changed his residence to Apartment 321B, 4000 Cathedral Avenue, Washington, D.C., and writes as follows: "Note my change of address. It's the same one I had before I entered the Army more than four years ago. You see, I've been promoted to civilian standing. I was lucky enough to have an abundance of civilian clothing, and to have gained only three or four pounds during my four years' sit-down. And now I'm back at my old insurance business where, as for the past 15 years, I specialize in insurance for the commissioned personnel of the Regular Army. My 21-months-old little girl is quite the cutest puppy that ever turned an apartment inside out. Now I understand what Shakespeare meant when he said, 'Macbeth hath murdered sleep; Macbeth shall sleep no more!' Macbeth must have been his baby."

Chuck Drew again offers the required encouragement with the following: "My thanks to you again for carrying the ball so faithfully and so adequately for 1919! Unfortunately for me, present responsibilities don't take me east, but I'm looking forward to dropping in on you one of these days."

Laurence A. Gillett sent this note from Norfolk: "Please change my address to the following — Assistant Chief Engineer, Virginian Railway Company, Terminal Building, Norfolk 10, Va. In January of last year I finally decided to go back to my old love, railroads, when an exceptional opportunity presented itself. So now I'm in the business of hauling coal and, if Mr. Lewis behaves himself, shall be pretty busy in 1947. We are living at Virginia Beach for the winter, but not permanently, unless I have luck and find a year-round domicile. I am trying to get my son into M.I.T. next fall. Wish me luck."

Jack Fleckenstein drops us the following comments from Ionia, Mich.: "There is not much to write about. I am still living here in Ionia at the same address and spending most of my time in Detroit, where you can usually find me at the Detroit Athletic Club. The crude oil picture in Michigan does not make things look very bright for the independent oil refineries. I did some pheasant and deer hunting this fall and also made two trips to Canada last summer, fishing speckled trout. The two girls are now 15 and 17 and still in high school. I expect to be in New York for 10 days next May at the International Philatelic Exhibition and will surely see you then."

Bob Hackett writes as follows from Boston: "You engineers certainly are wonderful people and have done miraculous things to help win the war. We, poor lunkheads, in the wool business still do not know how to enclose a check in a postal card. [Secretarial comment: Charlie Farist can show you how to mail a United States bill in a postal card, but he's in the button business.] There is no new news about me. I am still holding forth at the same old address. I am enclosing my check to help the class notes, which I certainly enjoy reading. My regards to you and the other boys around New York." — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

Readers of The Review will have noted the account of Vice-admiral Cochrane's appointment as head of the Department of Naval Architecture. We are proud to have Admiral Cochrane affiliated with our Class, as he got his M.S. degree in 1920.

Dr. David Flashman has recently become engaged to Adele Frank of Roxbury. Dave was a major in the war and served as chief of laboratory service in United States Army Hospitals. He was the pathologist at the Veterans Administration Hospital in West Roxbury and is now at the V.A. Hospital, Newington, Conn.

Ed Farrow has been elected to the board of managers of the Rochester Memorial Art Gallery. Henry Massey has opened offices with John A. Dailey at 103 Park Avenue, New York. Henry will continue to specialize in real estate and industrial loans and will devote his efforts to the sales promotion and financing of new construction and procurement of long term loans for growing industrial concerns. Henry has negotiated several notable real estate operations, including that for the National Broadcasting building on Fifth Avenue. Charles Lawson has left these parts and is in Hartsdale, N.Y. Harold Hunter is with the Celanese Corporation at Rome, Ga. Fritz Boley has left Chicago and is in New Castle, Pa. Irving Wilson's present address is 17 Larch Road, Lynn, Mass.

All of us who have read about the numerous and tragic hotel fires in recent months will be glad to know that one of our classmates is doing something about it. Perk Bugbee, as head of the National Fire Protection Association, has organized a large group of interested persons, including hotel owners and operators, and it is expected that the danger will be promptly and effectively reduced. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

In recognition of the signal honor which has been conferred on Val Vallarta, the Sunday editorial section of the New York *Herald Tribune* recently carried his photograph with the comment: "Dr. Manuel Sandoval Vallarta, Chairman of the United Nations Atomic Energy Commission, who presides over its destiny in this critical period of preparing recommendations for an international control system, was born forty-seven years ago in Mexico City and came to this country in 1917 to attend M.I.T. After graduation he joined the M.I.T. physics faculty and became known as one of the world's foremost authorities on cosmic rays. With Abbé Georges Lemaître, Belgian Jesuit, he developed the theory of cosmic rays as remnants of an original explosion of the universe ten billion years ago, six or seven billion years before the earth was born. The Mexican government called him home from the United States in 1942 to work with the National Research Council. As president of the Mexican Academy of Sciences, he was one of fourteen North American savants invited to Moscow in the summer of 1945 for the Russian Academy of Sciences anniversary celebration. In the Atomic Energy Commission he has supported the United States plans for world control." Val is a professor in the Polytechnic Institute of Mexico. His committee has recently released a report entitled "The Control of Atomic Energy," describing its scientific and technical aspects, which is published by the United Nations, Lake Success, N.Y.

Featured in the New York Boat Show and on display at one of the local department stores was the 22-foot Palmer Scott cabin cruiser, a product of the old salt of the same name who heads the New Bedford, Mass., shipyard of Palmer Scott and Company, Inc. — Paul H. Rutherford has been appointed special assistant to the vice-president of General Motors in charge of the Dayton, Canadian, and overseas household appliance organizations. — A note from Lawrence B. Richardson reveals that he has entered civilian life and is with the Curtiss-Wright Corporation at 30 Rockefeller Plaza, New York City. Retiring with the rank of rear admiral, he has long been identified with naval aviation and recently held assignments in the Bureau of Aeronautics, Washington, and at the San Diego Naval Air Station.

Laurence H. Banks, attorney and general manager of the Multigraphic Company of Boston, has been elected a representative to the Massachusetts legislature. — Donald S. Cheney started the New Year right with a January first letter from his new home, 90 Belmont Street, Hamden, Conn. For the past several years Don has handled the appraisal and valuation work for the Thompson and Lichtner Company, Boston consulting engineering firm. Last year he became associated with the Paterson Company of New Haven in similar work. Don, Jr., is now a prep school freshman at Hampden Hall and is aiming at a berth with M.I.T. '54.

An original card of greetings decorated in Indian style arrived from the Bob Miller family, whom our own Alfred promptly dubbed the "Cleveland Indians." In tribal array alongside their wigwam are Big Chief Bob and Squaw Helen with Peggy, Bobby, Betty, Jo, Kathleen and Papoose Jeanie with Trixie, the pup. To make certain that the cartooning and indicated housing difficulties were not taken too seriously, Bob included a snapshot of his very attractive family on the steps of the Miller Manse in Cleveland. Welcome words of cheer are also acknowledged from many others including Graciela and Helier Rodriguez, Helen and Saint, the Burcketts, Dave Woodbury, the Jacksons, Regina and Gus Munning, Frieda and Chick Kurth, and the Harry Fields. Harry forwarded one of the finest examples of the printing art in the form of the 184-page Christmas issue of *Paradise of the Pacific*, Hawaii's illustrated monthly magazine. Jampacked with articles and advertisements, ranging from Harry's own Hawaiian Electric Company to less pretentious endeavors, which fairly shout modernization and bespeak a healthy return to wealth-producing industry, it is understandable why Hawaii is bidding for early recognition as the 49th state. Mahalo, Harry.

During a recent flying trip to New York of our Class President, Ray St. Laurent, with Tom Johnson of his Rogers Corporation staff, we heard that Joseph M. Lurie joined Rogers on January first as director of research. — A full-page article in the November issue of *Mining and Metallurgy* is devoted to a biographical sketch of James R. Cudworth, who is the chairman of the mineral industry education division of the American Institute of Mining and Metallurgical Engineers and dean of the college of engineering of the University of Alabama. — Bob Neyland, coach of the Tennessee eleven, has been prominent in the news as a result of the New Year's Day upset in the Orange Bowl, in which the vaunted precision blocking and tackling of his Vols were not enough to withstand the Rice attack.

Rev. Williston Wirt, minister of the Community Church, Chula Vista, Calif., brings us up to date on his activities with a letter and a copy of the Christmas issue of the Church's weekly publication, *The Link*. After leaving his pastorate at the Congregational Church, Eugene, Ore., in February, 1943, to join the armed forces, Will says: "I spent three years as an Air Forces chaplain, attached to the Flying Training Command and stationed in the hottest, dryest part of the great American desert. My longest stay was at a basic flying field near Tucson. With the need for pilots finally ceasing, I bid for a discharge and got it in time to take over the leadership of this church a year ago. Chula Vista is a suburb of San Diego, halfway between it and the Mexican border. Famed for lemon groves and more recently, celery, the amazingly even climate has drawn so many homemakers that churches, schools, and other social organizations are expanding facilities. Although I have turned from electrical engineering to 'human engineering,' I find that the experiences and training of my youth furnish the basis of a way of life that is neither intellectually lazy nor scientifically incredible, and M.I.T. isn't without definite value, even to the background of theologies."

Dugald C. Jackson, Jr., finished his work at the Industrial College of the Armed Forces and has again become a civilian. Dugie spent five years in the Army, four of them as executive officer of the Fire Control Instrument Division at the Frankford Arsenal, receiving the Army Commendation Ribbon and being made a lieutenant colonel. After an assignment to the Aberdeen Ordnance School, he was designated a member of the Washington group of Army and Navy officers which analyzed the industrial problems of the war. He was promoted to the rank of colonel before beginning his terminal leave. The Jacksons' oldest son, a former naval lieutenant, is with General Electric in Schenectady, where he makes his home with his wife and two small sons. The second son, also a former naval lieutenant, is now with an engineering firm, and the third son has entered Lehigh. Daughter Betsy is active as a Girl Scouts leader. Dugie and Betty have stored their household goods and are temporarily at the family home in Cambridge. — The nationally syndicated newspaper column, "Their Birthdays" observed, on December 26, the birthday of Edgar E. Hume, a brigadier general in the Army Medical Department.

The recent Alumni Directory lists a number of the Class who serve in various capacities. Warrie Norton represents the Alumni Association as a term member of the Corporation of the Institute and, as past president, is a member of the Alumni Council. Lark Randall is a member of the executive committee of the Alumni Association, while Jack Rule, Chick Kurth, Josh Crosby, Charlie Williams, and Dan Harvey serve on other major committees. Frank Kittredge represents one of the local clubs on the Council, and Flemmon Hall and Dave Woodbury have been elected to Departmental Visiting Committees.

Local club officers serve groups from Portland to Portland: Elmer Campbell, President, Portland, Me.; Ed Praetz, President, Lawrence and Lowell, Mass.; Whit Spaulding, President, Baltimore, Md.; Elliott Peabody, President, Indianapolis, Ind.; Joe McEvoy, Secretary, Houston, Texas; Glenn Stanton, Secretary-Treasurer, Portland, Ore. Honorary Secretaries in this country include: Ed Farrand, Whit Spaulding, Wint Dean, Cac Clarke, Ed Lockwood, Munnie Hawes, Irv Jakobson, George Welch, Bill Sherry, Glenn Stanton, Charlie Herty, and Simon Freese; Charles Manneback serves in Brussels, Belgium.

News letters wanted. Where is yours? — CAROLE A. CLARKE, *Secretary*, International Standard Electric Corporation, 67 Broad Street, New York 4, N. Y.

1922

The 25-year reunion of the glorious Class of 1922 will be held at the Rockmere, Marblehead, Mass., on Friday, Saturday, and Sunday, June 13, 14, and 15. So decide right now to attend, or you will miss the opportunity of a lifetime to renew old worth-while acquaintances and enjoy the companionship of a big group of men who will try to behave as young as they were 25 years ago. Be sure to let the Secretary know your intentions promptly.

Conrad E. Ronneberg, formerly chairman of the division of physical sciences, Herzl Branch, Chicago City College, is now a professor and chairman of the department of chemistry at Denison University, Granville, Ohio. He was awarded the Bronze Star medal for his service as commandant of the Army Information and Education Staff School, European Theater of Operations, where he served as a lieutenant colonel.

Harry L. Freedman, director of the mental hygiene division of the Transportation Center at Fort Eustis, Va., was recently presented with the Conspicuous Service Cross by the governor of the state of New York for outstanding service to his country in the field of military mental hygiene and psychiatry. Major Freedman has also been decorated with the Legion of Merit and is authorized to wear the Army Commendation Ribbon. We hope that Freedman will get to the reunion so that we can tender our congratulations in person. Perhaps, too, he will find some interesting cases to practice on by the time the reunion comes to an end.

If you want to buy any chickens or apples or inspect country life at its best, stop and visit Ferris Briggs at the Chick'n Apple Hill farm at Clintondale in Ulster County, N.Y. According to Ferris' Christmas bulletin, he and Mrs. Briggs decided to forsake the hustle and bustle of New York City life and go back to tilling the soil in strictly rural surroundings. In the small village of Clintondale, they have bought a 25-acre farm, equipped to raise all kinds of animals, fruits, and vegetables, and their enthusiasm is at a high pitch. I am afraid that Ferris gets a wee bit lonesome at times, because he is so emphatic that he wants the gang to be sure to drop in on him.

We are sorry to learn that W. R. McIver of Oswego, Ore., has been confined to his bed by illness for a considerable time. We send him greetings from the Class and wish him a speedy recovery. Raymond Stoddard who lives at 70 Washington Park, Newtonville 60, Mass., is convalescing from a long, serious illness which involved two major operations. We know that the Class will be sorry to hear of this and meanwhile send him our hearty wishes for a quick return to full health. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York 14, N.Y. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

1923

These notes are written too soon after the first of the year, and too soon after my recent letter to the Class about plans for our 25-year gift, for me to make a report on the response to this idea. I feel sure that some members of the Class who are planning gifts or wish to replace the amounts which might have been realized on lapsed endowment insurance policies can make use of the 1923 Twenty-five-Year Fund which has been provided for in the Treasurer's Office at M.I.T. Through this fund it is possible for contributions to be made out directly to the Institute and credited as an income tax deduction over a period of three years — 1946, 1947, and 1948.

Our first contribution was from Raymond P. Harold, President of the Worcester Federal Savings and Loan Association. I also have a clipping from the Worcester *Telegram* about him, saying that on December 13 he was among five directors elected to the board of the Boston Federal Home Loan Bank.

Julius A. Stratton, Professor of Physics at Technology, has received the Medal of Merit from the War Department "for contributing greatly to the success of radar." — Edison B. Middlekau, for 20 years purchasing agent for The Texas Company, New York, died on December 6 at the Kew Gardens Hospital in Queens. He leaves a wife and daughter.

The Buffalo *News* of November 2 described the wedding of C. Arnold Dutton of Youngstown, N.Y., to Dorothy P. Cooke of St. Catharine's, Ontario, at St. John's Episcopal Church in Youngstown. The bride has been a captain in the Army Nurse Corps. They were scheduled for a Bermuda honeymoon and residence in Youngstown after November 25.

From Professor Locke, I have it that Walter H. Newhouse, formerly Professor of Economic Geology at the Institute, has joined the faculty of the University of Chicago. He assumed his duties there on October 1. Newhouse has a bachelor of

science degree from Pennsylvania State College and degrees of master of science and doctor of philosophy from Technology. During World War II he worked on titanium deposits in Wyoming in addition to his teaching assignments. He is the editor and chief contributor to the book published by the National Research Council committee on processes of ore deposition. — Horatio L. Bond, *Secretary*, 457 Washington Street, Braintree 84, Mass. Howard F. Russell, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1924

This is an all-Quarles column this month, as will be recognized by those who note the Alabama accent, adjectives, and allergies.

Rock Hereford was in New York on the fourth of January. He was here to give a talk before a crowd of produce manufacturers or something, on the new refrigerated freight car, which is being manufactured by his firm, the Consolidated Steel Corporation in Los Angeles, Calif. He blew in at the new quarters of the Technology Club over at the Architectural League, 115 East 40th Street. He is looking great and I venture to say is among the youngest and most healthy of '24 men today. Your junior (?) Secretary ran into Rock and Dave Evans, while doing the usual Monday morning commuting jaunt to New York. Dave, incidentally, is living in New Canaan, Conn. No street address is needed for Dave. I understand that after directing the War Production Board on how to produce aluminum, down in Washington, Dave is now dealing in astronomical figures (other people's?) down on Wall Street.

James J. Enright (Latin American Jimmy) blew into New York in January, en route to São Paulo, Brazil, where he goes to straighten out some of Firestone's financial problems for the second time. Jim is treasurer of Industria de Pneumatic Firestone S.A. He has two daughters, one of whom is talking marriage, and a son. To anyone down that way, looking for tires or a good time, I suggest hunting him up.

From Jim comes the news that Dave Meeker is now holding down the presidency of the Hobart Manufacturing Company, in Troy, Ohio. I was glad to get this news about Dave and to learn that I had helped support a classmate while running Battery D, 10th Coast Artillery, back at Fort Eustis, Va., in 1941. The only reason I bought a Hobart potato peeler and a few other fine laborsaving devices while there, was to keep up the morale, only to have the discipline go haywire. Ed Johnson, I understand, is also with Dave in the same company.

Freddie Stevens is in Akron with Firestone Tire and Rubber and I understand is the proud possessor of a daughter. She also must be approaching the marriageable age. I wish some of those men would drop me a card some day, and I am particularly anxious to learn whether Freddie Hungerford, Johnny Fitch, and Harry Estill are still alive and kicking as usual. I have employed the services of the latter three, but they aren't worth much, so far.

Jim Enright informs me that Doctor Adolpho Santos is now a hydraulic engineer for the São Paulo Light and Power Company, in São Paulo, Brazil. Bill MacCallum is still commuting daily to New York, to draw his pay from the Modern Talking Picture Service, 9 Rockefeller Plaza. I haven't seen Bill in a long time, but was recently delegated to send him love and kisses from one of his old Southern belles. Pret Littlefield is treasurer of the Canada Dry Ginger Ale Company, 100 East 42d Street, New York. As for your Assistant Secretary, he is struggling along with his wife and 28-months-old daughter.

Frank Manley turned up at the Civil Engineers' luncheon staged by the New York Technology Club on the 16th of January. Frank is real estate assistant to the vice-president of the Rockland Light and Power Company in Nyack, N.Y. After leaving Technology, Frank studied law and received his law degree from the University of Newark. Dick Holt is a rate expert for Rockland also. Guild Holt, the Cross Country Track Team captain, is with the National Biscuit Company, here in New York.

Our job of reporting on you fellows would really be *much* easier if you would only drop either Frank Barrett or me a note every so often. Even our imagination runs out in due time. — Francis A. Barrett, *General Secretary*, 234 Washington Street, Providence, R.I. William W. Quarles, *Assistant Secretary*, Hollow Tree Ridge Road, Darien, Conn.

1926

Our peripatetic classmate, Bill Millar, can now be addressed at Anglovaal House, Fox Street, Johannesburg, South Africa, where he is African representative of the New York investment banking firms of Lazard Frères and Company and Ladenburg, Thalmann and Company. He is also alternate director for the recently formed American Anglo-Transvaal Investment Corporation, which will hold substantial interests in South African mining and industrial enterprises.

Colin W. Reith has been voted a director of the Standard Oil Company of Texas. — After an association of many years with R. R. Donnelley and Sons Company in Chicago, John Drum has become treasurer and assistant general manager of Glascock Brothers Manufacturing Company in Muncie, Ind. — John Deignan, formerly chief development engineer with the United States Engineer Office in Buffalo, is now on the West Coast, with Drake-Puget Sound in Seattle.

With much regret the Secretary reports the sudden death on December 26 of E. Kendall Bragg of Cambridge and Needham, well-known Boston lawyer. A graduate of Harvard in 1923, he attended the Institute with our Class for a short time before entering Harvard Law School, where he was graduated in 1927.

The Navy Department has transferred Captain Leonard Kaplan from San Diego to New York City. His business address is Office of the Superintendent of Shipbuilding, 11 Broadway, New York, and he is living at 39 Lincoln Park, Newark, N.J. — Walter Campbell's new architectural office is located at 38 Newbury Street, Boston, with "Campbell and Aldrich" on the door. — William Dunnell, Jr., has joined the staff of M.I.T.'s Division of Industrial Coöperation, where he will be associated with Stark Draper. The roster of 1926 men now on the Institute staff, in addition to Dunnell and Draper, includes Beckwith, Rauscher, Wilbur, and Killian.

Harry Hemphill, who for a time was associated with Western Electric in Bayonne, N.J., is back again with the Shill Rolling Chair Company in Atlantic City and is living in Linwood, N.J. — Charles McHugh continues with Raybestos-Manhattan in Passaic, N.J. His new home address is 310 Spring Avenue, Ridgewood. — Henry Sargent also has a new home address, 135 Altadena Drive, Pittsburgh, Pa. He is assistant to the vice-president of the Carnegie-Illinois Steel Corporation. — John Sumner, formerly of Abington, Pa., is now living on Parkside Road, Plainfield, N. J. — James R. Killian, Jr., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1930

We are happy to report the marriage of Jimmy Holden to Eleanor Jackson Price of Akron, where the groom is a patent counsel in Goodyear's law department. After three years at Goodyear Aircraft, Jack Bennett is now an assistant treasurer of the parent company, handling exports chiefly. Ted Riehl is developing experimental tires for the same company. Fluque Rowzee is in Europe for an extensive trip in connection with synthetic rubber development for the Canadian Polymer Corporation. The above news is all from our President, who reports that Hijo Marean has a new job with Du Pont, involving considerable traveling. — Howie Gardner writes from Rochester that he has completed work on his doctorate in chemical engineering at the Institute and that George Wyman is now in De Pue, Ill., for the New Jersey Zinc Company. Wilbert McCluer has been appointed plant manager for Rohm and Haas at Bristol, Pa. Major Stan L'Esperance has been transferred from Mitchell Field, N.Y., to the Eleventh Air Force headquarters at Harrisburg. Frank Hankins is the new operations manager for Pan American World Airways' Atlantic division. He has been with Pan American since 1933 and makes his home at Huntington, L.I., with his wife and three children. — It is with deep regret that we record the passing of George Wardner at Portland, Ore., on January 5. George was a prominent architect with Sutton, Whitney, and Aandahl of that city.

While enjoying his terminal leave at home in Pasadena, Bob Rypinski writes that he certainly appreciated The Review both before and during the war but looks forward to its continued improvement. That means more letters from all classmates containing news and more news. Your interest in the Alumni Fund brings joy to the Class Agent's heart, and he's counting on us all to make the showing of 1930 in the coming campaign even more gratifying than in the one now concluding! — Parker H. Starratt, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass.

1932

By the time you read these notes, you will probably have received our mailing on plans for the 15th reunion this June. Don Gilman has been in touch with Tom Sears, and he is getting things under way.

My appeal for your views on this subject has not been answered; but we trust this is not a measure of your interest.

Al Dietz is busily engaged in a research program for the Plastic Materials Manufacturers Association. In writing him concerning this project, I asked for some news, and below is his generous reply: "I don't know too much about very many people in the Class, but I can pass along what information I do have. You may know that Howard Quigley, who used to be in charge of the school for the deaf at Olathe, Kansas, is now in charge of the school for the deaf at Faribault, Minn. Quig has moved along from one job to another in this field and has rapidly approached the top. The school he is with now is among the leading ones in the country, and he seems to be doing an excellent job. Quig was doing this sort of work before he came to Technology and went back into it in 1932 for the obvious reasons that there was at that time practically nothing doing in the structural and building line. It looks as if it had been a good move on his part. Henry Chapin is with the American Brake Shoe and Foundry Company down at Mahwah, N.J., and is doing an outstanding piece of work in the metallurgy laboratory of that outfit. There has recently been a second addition to the Chapin family which is keeping Henry and his wife very, very busy, to say the least. Bob McCaa recently left the Magnaflux Corporation and is now down in Philadelphia. The move suits him because he originally came from Lancaster and has a lot of relatives and friends in the Philadelphia area. He seems to enjoy his new work very much indeed. Al O'Neill has joined the staff of the Building Engineering and Construction Department here at the Institute and is keeping very busy working in the laboratory as well as with the classes, especially in the drafting room. The department is getting out a series of 10 volumes in the field of construction. The first of those, my book on *Dwelling House Construction*, has just appeared; the others are due to come out from time to time as they are completed."

Tom Jenkins, a commander, was married in December to Mary Pauline Gage. From the clipping announcing this marriage we learned that Tom is attached to the American Embassy in London and that Mrs. Jenkins is a graduate of the University of Oklahoma and has a master's degree from the Juilliard School of Music. — CLARENCE M. CHASE, JR., *General Secretary*, 1207 West 7th Street, Plainfield, N.J. *Assistant Secretaries:* CARROLL L. WILSON, National Research Corporation, 100 Brookline Street, Boston 15, Mass.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1933

The following information has been gathered during the month. A letter from Bill Rand reads in part as follows: "A few months ago W. F. Talbot, who was technical director and an officer of the Sun Chemical Corporation, where I labored, was appointed executive director of the newly formed Stanford Research Institute. (Dr. Talbot, by the way, always horns into M.I.T. meetings on the basis of two weeks of special study he once put in at Tech!) He offered me the post of assistant director in charge of organization and administration; and the prospect of California, with an intriguing job helping to build an outfit from the bottom up, was too much to resist. I have been out here a little more than a month, getting started and going through the awful but necessary torture of selling a house and buying a house simultaneously, said houses being more than 3,000 miles apart. All that is now behind me, and by the middle of January, I should have family and furniture settled. We have fond hopes that some day the Stanford Research Institute will be the Mellon Institute of the West. It is a nonprofit institution and completely independent of Stanford, although located on the Stanford campus and supported in its infant stage by Stanford and West Coast industry generally. Eventually, we shall have our own buildings and staff and will conduct industrial research in the fields of engineering and in the physical and biological and social sciences. If you or any of our classmates visit this area, I do hope you will get in touch with me."

We received word that Katherine W. Carman has resigned from the staff of the Great Lakes Carbon Corporation. Her address is 620 Sunset Drive, Evansville, Ind. — S. H. Walters and John Sterner are still connected with Baird Associates, Inc., of Cambridge, Mass. — Dick Fossett wrote a brief note on his Christmas card, in which he says, among other things: "I am back as production supervisor at our soap plant in Long Beach, Calif. — and enjoying the climate, of course. I hear that Bob Winters is a member of the Canadian Parliament from Lunenburg, Nova Scotia."

A card from Nat Goodman reads, in part: "I'm still in the garment business and back in shirtmaking after a three-year stretch making hospital and civilian pajamas during the war. We're living in Williamsport, Pa.; the family numbers two youngsters; and the younger, a boy, is already showing engineering aptitude. Gene Nedbor, I, was a recent visitor. He is with Walsh Construction on the General Electric job at Syracuse after serving as an instructor at Belvoir in the engineer school." — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn 7, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1934

Here is an anecdote that we are sure you will find amusing because it is so typically the performance of a Tech man. Allan K. Cook, who lives in Louisville, Ky., was to become a proud papa and, taking his responsibilities seriously, he set about to prepare for the event so that his baby should receive the best of care and his wife should be relieved of unnecessary drudgery. Allan built a box in which to keep the baby — now don't get any preconceived ideas — a great big, air-conditioned box about five by four by three feet with a sliding, plate-glass front and lights inside. The air going to the box is filtered and then run over heating coils which are thermostatically controlled to keep the temperature at 84 degrees. A fan keeps the air flowing through the box. To be sure that the thermostat does not get out of order and allow the baby to become either too warm or too cold, Allan has four bimetal strips inside the box which sound a buzzer if the temperature gets outside the control range. Inside the box, the baby wears nothing but a pair of three-cornered pants. The bottom of the box is covered with a stretched canvas, topped with a nylon sheet. The arrangement allows the baby to roll around and kick without confinement. Mrs. Cook is enthusiastic about the arrangement, since it minimizes the washing of little things. Incidentally, as Mrs. Cook calls Allan "Cookie," they have nicknamed the baby "Cream Puff."

Bill Milliken is heading a project that he hopes will take some of the guesswork out of airplane design. Bill is now assistant director of the flight research department of the Cornell Aeronautical Laboratory in Buffalo. He is attempting to reduce airplane design to readily applicable formulas. His program, a study of dynamic stability and control, got under way two years ago, when he joined the laboratory staff after having worked on flying wings and B-29's on the West Coast. Starting with the loan of a B-29 bomber from the Army Air Forces, the research has developed into a $500,000 project with the active support of the Army, M.I.T., and commercial automatic pilot manufacturers. By measurement of the reactions of an airplane to various controlled movements in actual flight, Bill is attempting to translate these reactions into mathematical terms. He claims that designers have five or six rules of thumb as guides, obtained through years of experience and that they proceed on a cut-and-try basis. When they branch out into radical models like the flying wing or rocket missiles, they have no experience to guide them. Designing is still an art rather than a science. The project involves the services of 40 people — engineering, photographic, instruments, shop and data-analysis experts, mathematical theorists, and practical fliers. Bill had 5,000 hours in the air, including 1,000 as a pilot.

George Paul Sweeney was married on December 28 to Rita Rose Bissonnette, daughter of Mr. and Mrs. Louis A. Bissonnette of Bridgeport, Conn. George, who is a former captain in the Army Engineers, is now a civil engineer with the War Department, Corps of Engineers.

Do you fellows remember back to the carefree days at Tech when you participated in one or more of the athletic activities, fencing, hockey, swimming, wrestling, or one of the other sports? At that time we did not give much thought to who footed the bills that made these sports possible. But at that time it was the Alumni who had come before us who dug down into their jeans and helped finance some of the expense. Now we are a part of that alumni group, and it is our turn to do a little something to repay our predecessors for their generosity. A dollar or two from each of you will amount to an appreciable sum from the whole Class, and you will get more than two dollars' worth of satisfaction out of sending it. So dig down into your pockets and get your contribution out right away. Checks should be made payable to Ralph T. Jope, Secretary-Treasurer, and sent to the M.I.T. Advisory Council on Athletics, Cambridge, Mass. Be sure to make a notation of your class, so that '34 will be credited with your dona-

tion. Many thanks on behalf of the council. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, Chile Exploration Company, Chuquicamata, Chile.

1935

Walt Marshall has resigned from the M. W. Kellogg Company to join the growing roster of classmates in business for themselves. During his first years with Kellogg, Walt took part in the development of thermal and catalytic polymerization processes. Later, he had charge of process design for ammonia manufacturing facilities at the Dixie Ordnance and Mathieson Alkali works in Louisiana. Walt also served as process engineer for high-octane gasoline hydrogenation plants for the Standard Oil Company of Indiana and for the Lago Oil and Transport Company in Aruba, Netherlands West Indies. Walt's service with Kellogg was interrupted by three and one-half years in the Navy, from which he was discharged with the rank of lieutenant commander. Walt's own business is the Marshall-Moorman Development Company with offices at 19 Rector Street, New York City. In this enterprise he is associated with Joseph W. Moorman, a graduate of the University of Tulsa and former Kellogg chemical engineer. The company offers consulting and process engineering service to the petroleum and chemical industries on the application of fluid catalyst techniques.

Jack Du Ross responded very promptly to a plea for news of his activities. Jack lives at 17221 Edgewater Drive, Lakewood, Ohio, his seventh address in the vicinity in less than 10 years. For that Jack lays claim to the most-local-moves record, leaving for others the possible distinctions of most prosperous, most traveled, most learned, and so forth. Jack is married and has two boys and a girl, the last, Jack Jr., born Friday, the 13th of this last December. Jack, Sr., has two businesses. As assistant sales manager of the Weideman Company, wholesale grocers, Jack claims to labor from seven to five on week days and until noon on Saturdays. His morning hours probably better most of ours by one or two. Nights, Saturday afternoons, and Sundays, Jack devotes to the Du Ross Company, operators of a rooming house. The house, he explains, has 79 rooms. Modesty or the Bureau of Internal Revenue must stand in the way of his gracing the establishment with the title, "hotel" or "apartment." Jack reports that it is six years or more since he has encountered a classmate, and that, a chance meeting with Pete Grant on a streetcar in Cleveland. The welcome mat is out at the Du Ross homestead, telephone Lakewood 5159. — J. BARTON CHAPMAN, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

1937

We have finally accumulated enough news to make it worth while to write some class notes. Since I last did this column, only two fellows have contributed directly by letter anything to report. Dick Young, now purchasing agent for the Weatherhead Company in Cleveland, mentioned our 10th reunion, coming up this year. In the November column, I asked for expressions of opinion as to what type of affair we should have. So far, only two or three have responded. Dave McLellan is going to appoint a committee to get things started. Dick wrote that Art Zimmerman is now sales manager for one of the finer forging companies in Cleveland — the Steel Improvement and Forge Company. Art left the Weatherhead Company to join them.

Phil Dreissigacker writes as follows: "You will note that my address is St. James, La. I am still with the Farrel Birmingham Company, Ansonia, Conn., but since August my wife and I have been here in Louisiana. Our company is putting up a sugar mill, and I am the resident engineer. Upon its completion, toward the end of February, we shall return to Connecticut. One week end in New Orleans, I ran into Jack Corbett of our Class. He is a major and on that very day had disembarked at New Orleans from two years in India. He will be at home in Portland, Maine, for 60 days, then off to Fort Winfield Scott, California. As to a reunion next year, I am all for it. How about a resort-type reunion with golf, tennis, and so on, to be held on a week end somewhere in New England? I have no particular place in mind at present but have stated my ideas in brief." How about a few more ideas on the subject, fellows?

We have only two marriages to report this time — that of Mary Jo Travis to E. L. Vollmer in St. Louis and that of Jean Ingraham, a former WAVE, to Donald S. Duncan. Donald Duncan did research and development work on the atomic bomb with the Manhattan Project and is now on the teaching staff at the Pratt Institute school of engineering. William Penn recently passed the Massachusetts state board of pharmacy examinations. He is a chemical engineer for the General Electric Company at Lynn. Robert Hopkins is now an assistant professor at the University of Rochester. Dave McLellan, formerly research assistant at M.I.T., is connected with the Reynolds Metals Company at Longview, Wash., in the capacity of research engineer. J. R. Ferguson is plant engineer at the Carnegie Illinois Steel Corporation.

The October issue of *Mining and Metallurgy*, has the following to say of Carlton Beal: "Carlton Beal, one of the spark plugs that has been igniting the activities of the younger members of the Institute in the Southern California area for the last few years, is Secretary-Treasurer of the Petroleum Division. Another young man in the Division — he has had a good educational background for the industry with a B.S. degree in geology and civil engineering from Stanford and an M.S. degree in petroleum engineering from M.I.T. During the summers of his college years he served as a roustabout and laboratory assistant for the Kettleman North Dome Association as well as roughneck and rotary helper on drilling wells, and as a geologist and petroleum engineer for the Iniskin Drilling Co. in Alaska. Early in 1938 and until December 1941 he was an oil-field and land scout and assistant division development engineer for the Tide Water Associated Oil Co. In January 1942 he was made a member of the Engineering Committee for District 5, all Western States, to regulate and supervise the efficient distribution of oil and gas production. Two years later he was employed by the Richfield Oil Corp. where he served in a supervisory and advisory capacity to management regarding value of proved and semiproved oil and gas properties. Promotion to chief evaluation engineer for the corporation came in April 1945 and was interrupted by service for the PAW which made him assistant director of the production division. Mr. Beal is carrying on in the industry as a consultant in Los Angeles. He is married and has three children."

Bob Fischel, formerly with Republic on Long Island, is now with the Civil Aeronautics Administration in Washington. Lee Wasserman has been with the dynamics branch at Wright Field for the past seven years. William Bergen is with Martin Flight Research. David Hill and John Pitkin are with the power plant group at Lockheed. John now has two children. Jack Robbins is now with Calco Chemical in Bound Brook, N. J., and is the father of a three-year-old girl. They now live in Fanwood, N.J.

We received the very saddening news that I. Rupert Lewis lost his life in a Brookline apartment house fire in December. Rupert had served as a senior grade lieutenant aboard the destroyer U.S.S. *Philip*. Later he was assistant engineering officer aboard another destroyer, the U.S.S. *O'Brien*, and took part in the Normandy invasion and the attack on Cherbourg. Before the war, he was more or less a neighbor of ours, working for the Cornell-Dubilier Electric Corporation in South Plainfield, N.J.

Norm Robbins has a little girl, born last May. We are proud to announce the arrival of our third, a son, Thomas Winthrop, who, along with my new business venture, the Johns Manufacturing Corporation, keeps us plenty busy. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield N.J. PHILIP H. PETERS, *Assistant Secretary*, 7 Kirkland Circle, Wellesley Hills 82, Mass.

1939

Via the Christmas card route we discover that Dave Frankel is in Quebec (or was) on a skiing vacation: "This Laurentian country sure is beautiful," he says. But let's hear more. And likewise from Fred Cooke we glean the following: "My sphere of operations has changed since I last scratched off a line to you. At present I'm on duty at the Bureau of Yards and Docks of the Navy Department, and having been here only a short time, am still trying to learn what it's all about. Some time ago I signed over to the regular Navy, so shall probably be at this sort of thing for a while yet. I guess it was in the blood. I'm finding Washington a very lively place indeed."

Two engagements recently announced are those of Dave Morgan to Kitty Claire Chalk of Dallas and Irv Cohen to Olive Perlman of Boston. By the time this reaches print, the first mentioned will have become passé in favor of wedding announcements, and so forth. Best wishes to all four!

Pete Bernays, our active Course Secretary, has come through with an up-to-date version of the activities and lives of the V group as follows, beginning appropriately enough with news of Pete's own recent experiences: "Since last I saw many of you,

I have completed work for both a master's and a doctor's at the University of Illinois. Thereupon I went on active duty as a second lieutenant in the Chemical Warfare Service and was stationed at Edgewood Arsenal, Md., where I saw Mark Curgan and Mel Falkof. That was in June, 1942. From there I went to air force units, teaching defensive chemical warfare tactics, and being stationed near Spokane, El Paso, and Salt Lake City. In November, 1943, I went to Hawaii, where I was finally placed in charge of awards and decorations work for the Army Forces in the Pacific Ocean areas. In February, 1946, I returned to the United States as a major, and since September I have been teaching at the Illinois Institute of Technology, where I am an instructor in chemistry. My fields of interest include analytical, x-ray, and inorganic chemistry. To date, I am single.

"I find that Edmund Rittner is now at Phillips Laboratories, Inc., Irvington-on-Hudson, N.Y. His address is now 1222 Main Street, Peekskill, N.Y. He writes: 'After leaving the Chemistry Department at M.I.T. in 1942, I worked with Professor von Hippel in Electrical Engineering on a number of war problems, the work terminating in May, 1946. This got me into the field of semiconductors, more particularly photocells. The results of the research are published in a number of recent papers in the *Journal of Applied Physics*, the *Review of Scientific Instruments*, and the *Journal of Physical Chemistry*.' In May, 1946, Dr. Rittner moved to his present location, where he is in charge of 'photoconductivity' as a section chief.

"Also working with Von Hippel at one time was James Schulman, now with the Naval Research Laboratory, in Washington, where he is working on luminescent materials, at the head of a group studying phosphors and semiconductors. Jim worked with Von Hippel until March, 1944. Thereafter he went to Sylvania Electric Products in Salem. He is married, and the papa of three children, Norma Miriam, aged five, Barbara Ellen, nearly two, and Michael Robert, four months.

"Another Ph.D. is Hewitt Fletcher, who received his degree in 1942 from Technology. He reports: 'From 1942 to 1945, I was an instructor in chemistry at the Institute (teaching elementary organic, organic preparations, organic qualitative and quantitative and directing S.B. and S.M. thesis researches), while also serving as consultant for the Atlas Powder Company.' Now he is on leave of absence from M.I.T. as Chemical Foundation fellow, National Institute of Health, United States Public Health Service. His research has centered mostly on carbohydrates. He is married and has two children — Bradford York, aged four, and Robert Theodore, aged one. Although I have not received letters from them recently, I can report that Mel Falkof and Dave Mullin are both married. I have run into them, as well as Phil Lucas and Herb Jaffe, at American Chemical Society meetings since I came back from Hawaii. In fact, I have before me a long letter from Herb Jaffe, now also a doctor, written the day his terminal leave from Army duty, as a first lieutenant in the Sanitation Corps, ended. He is now at Harvard Medical School as a research fellow in medicine, working at the Thorndike Memorial Lab of the Boston City Hospital. Quite a mouthful that title, but Herb put it into his letter, since he could not report any news along marital or parental lines.

"Getting near the end of our alphabetical list of former members, I find that Larry Woolaver is 'one-third of the chemistry department at Mount Allison University, in Sackville, New Brunswick.' He spent some time at the Experimental Station of E. I. du Pont, as well as in their ammonia department, after receiving a Ph.D. at M.I.T. in 1942, and getting married in August of that year. Art Olson writes: 'I am married (1942), have two boys — one, two and one-half years, and the other, one year old. I spent the whole war, from January, 1942, to September, 1945, in the Chemical Warfare Service Development Laboratory at Technology, ending as a captain.' He worked on canister design, and after leaving the Army and loafing awhile, joined the research division of the United Shoe Machinery Corporation. Art reports the presence of Jack Stiff and John Ohlson at Technology, or in the Chemical Warfare Service Development Laboratory, during the war — also, that Jack is with Binney and Smith in New York City, and John with Armour here in Chicago. We have received no confirmation from either.

"Mark Curgan went from Edgewood, where I last saw him, to Los Angeles, and then to Panama, Ecuador, and the Galapagos Islands. He returned as a major in the Chemical Warfare Service. He is married, has a daughter Marjorie Hope, and is working as research chemist for the Aspinook Corporation in Lawrence, Mass. John Carter is now in California, where he is married, and has one son, Joe, aged five. He is in a partnership with several other chemists, manufacturing on a limited scale organic chemicals from various petroleum origins. The outfit plans to job and sell industrial chemicals useful in leather processing, plastics, or wetting agents. John invites further inquiries. During the war he was with the Tide Water Associated Oil Company.

"Also in business for himself, is Ernie Kaswell, who is associate director of the Fabric Research Laboratories, Inc. Ernie now has a master's in Textile Technology from M.I.T. During the war his outfit did work for the Quartermaster Corps and the Air Forces. He has been married since 1943 but has no children to date. Ernie reports that he sees Harold Hindman, who is a research associate in charge of the Slater Research Laboratory (textiles) at M.I.T. Ernie also wrote that he had seen Bill Postman, who is with the Calco Chemical Division, in Bound Brook, N.J. Ernie mentions seeing Maynard Smith, Joe Zallen, and Mel Falkof. If you see them again, tell 'em to write me, so that I'll have news for another letter.

"Harold Snow took time out to report that he was working with his Dad in a food cannery (the F. H. Snow Canning Company, Inc.). After working in the pioneering division of Du Pont in Buffalo, Harold, his wife, and his three daughters are now in Pine Point, Maine." — STUART PAIGE, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn. ROBERT C. CASSELMAN, *Assistant Secretary*, 271 Cypress Street, Newton Center 59, Mass.

1941

Greetings, classmates. We are writing this installment in a four-motor plane 3,500 feet above sea level. The passengers' flight log says we are 10 miles north of Rockford, Ill.; in an hour we should pass over St. Paul, Minn. Our mission is "Williwaw" at Adak, Aleutian Islands, and we are still working for the Quartermaster Corps in textile research.

There are more notes in our mailbag than we can possibly include at one time; so be patient while we dig. Rogers Finch is handing out cigars in acknowledgment of Steven Finch, who arrived on January 5. Barbara, we hear, is fine. The marriage of Helen Tripp to Fred Davies has been announced. Helen Sullivan is now Mrs. Clarence Davis. Shirley Brown is married to Don Howard. Virginia Green, who attended the Institute with our Class, is now Mrs. Richard Snow. Ken Bohr and Gwyneth Griffin walked the aisle together last June. Ken, who served in the Army for four years, two of which were in Europe, is studying for his Ph.D. in Metallurgy at the Institute. Shirley Squires is engaged to Dick Gill of Boston College track fame. In July, Constance Truesdell exchanged pledges with Ralph DeLano. Jean Hallas is now Mrs. Warner Knight. Elaine Treitman and Bill Lifson were married last August. Bill Compton took Dorothy Whealton as his bride in October. Helen Waslo and Mike Masnik are now man and wife. Anne Perkins is engaged to Dave Dewey. Dave received his Sc.D. in 1941, then entered the Navy, in which he served as a lieutenant commander. He is now with the American Research and Development Corporation in Boston. Alma Westman is engaged to Crosby Baker. Crosby is with the American Smelting and Refining Company at Denver. Elizabeth Oliver was married to George Palmer last December. Mary Louise Cahill is engaged to Frank Regan. Our belated congratulations and best wishes to you all.

J. L. Klein, who in 1943, began work with the Jessop Steel Company in Washington, Pa., as a metallurgical research engineer, has recently been appointed director of research for that company. George Quinn, who was associated with the atomic bomb development at Oak Ridge, Tenn., during the war, is now instructing at Columbia University in chemical engineering. Dave Saxon has joined the research staff of the Phillips Laboratories, Inc., and is in charge of the section on theoretical physics. Dave received his B.S. and Ph.D. at the Institute. Dave Josefowitz has joined his brother Sam in a new classical record company. Good luck in the new work, fellows!

We may have announced these new arrivals before, but we must make sure. Karen Elise is an addition to the Johan and Elise Andersen family. Robert Dean Gott is at a point where he definitely recognizes his parents, Alice and Lester. Captain and Mrs. Zachary Abuza are quite proud of daughter Nancy Edith. Betsy and Paul Erlandson have a daughter, Ann, about 15 months old. Paul is with the Bureau of Ordnance of the Navy Department in Austin, Texas, and is working towards a Ph.D. in physics at Texas University. Paul writes that he has heard from Bill Unger,

who is now with the Radio Receptor Company. Bill has bought a home on a lake 45 miles from New York City and writes praises of his own young daughter. Alan Surosky is working for Eastern Research and Development in New Haven and speaks highly of son Stephan, who is slightly more than a year old. Charley Whitney writes from San Francisco, where he was stationed during the war, converting and repairing Army transports. Charley is married and is the proud father of an eight-months-old son. He is now with a navigation company working on reconverting troopships back to luxury liners. Whenever Charley thinks of the East and of returning, he remembers January in Cambridge and sits tight. There are several Tech men in San Francisco: Phil Fresia, Bob Hall '40, Ray Keyes '40 and Carl Meurk '42. — STANLEY BACKER, *General Secretary*, 101 Providence Road, Primos, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

1942

Time has gone by so fast that it hardly seems possible that we have been out five years. The question of a reunion this June arises. Please write in your ideas and suggestions on the subject.

There is a great quantity of news this month. Bill Bolhofer writes that he will be back at Technology this spring as a graduate student in chemistry. He has been a research chemist at Merck and Company. Joe Altman is a physicist at Eastman Kodak. Joe is still single. He writes: "Pete Hellige is working in the labs. I ran into Bob Vyverberg, whose home is in Rochester, a few weeks ago. He is now on the staff of the University of Rochester." William Andrew is working at M.I.T. as a research engineer. He says he is still single and was discharged from the Navy last May. Another research engineer at the Institute is Lawrence Beckley. Lawrence lives in Lynn, Mass., is married, and has two daughters. He served in the Navy during the war.

Donn Barber writes from Niagara Falls, N.Y., where he works as a process engineer for the United States Vanadium Corporation. Donn has been married for about a year. He writes: "I saw Chuck Dodson in town. He lives in Sanborn, N.Y., with his wife and one child. Also Hank Henderson writes that his address will be Alexander City, Ala., as of January 1. They now have one boy and one girl." René Bourguet was discharged from the Navy last May. He lives in Baldwin, Long Island, is married, and has one daughter. Malcolm Brown writes: "At present I am working as a research chemist at Merck and Company in Rahway, N.J. After getting my Ph.D. in July, 1944, I went to work at the Merck plant in Elkton, Va., and later transferred to the main lab in Rahway. My family numbers three. I was married in March, 1942, and our daughter, Deborah Sue, was born on April 30, 1944. We have our own home in Clark Township, N.J., and aside from the Jersey mosquitoes enjoy living here. I see Bill Bolhofer at work but haven't met many others from our Class."

Here is a letter from Bruce Anderson. Bruce lives in Ipswich, Mass., and is a research engineer with the United Shoe Machinery Corporation in Beverly, Mass. Bruce has been married since April, 1942. He writes: "You probably know that Phil Phaneuf is also with United Shoe. He was married last summer in Louisville, Ky. I bumped into Alan Katzenstein about three weeks ago. He's with the Sealtest Corporation. He spent an interesting summer out on the West Coast with frozen food processors." John Cantlin writes from Dayton, Ohio, where he is working at Wright Field. John is married and has one daughter. Calvin Morser was married on December 14 to Mary Hausman of Lakeville, Conn. We have an announcement of the engagement of Betty Hill of Wellesley to Arthur Porter.

Definite information has now become available that Sergeant Burt C. McNall, who had been reported as missing in action, lost his life on the date of his last flight, November 10, 1942. We regret to report the death on November 29, 1946, of Frederick E. Lykes, Jr., XV.

Please write in your news. In particular, let us know how you feel about a June reunion. — WARREN S. LOUD, *Acting Secretary*, Room 2-272, M.I.T., Cambridge 39, Mass.

1944 (2-44)

Your Secretary has great hopes of getting you members of the Class to drop me some notes to pass on to the brethren. So far, I have been accumulating information from hearsay; so much of it may be slightly incorrect. In any event, it takes news to make this column a success.

Mal Kispert can be seen around the halls of the Institute quite often these days as he is acting in the capacity of assistant to President Compton. It is a wonderful job for him, and he is handling it like a veteran. Incidentally, he is married and has a little boy, named Robert Gordon Kispert. Because of the housing shortage, his wife lives about 50 miles outside of Boston; so he is able to see her only on week ends.

Ensign Elbert B. Pritchard is reported to have died of wounds received in action in the Pacific. This makes the sixth death in our Class attributed to the war.

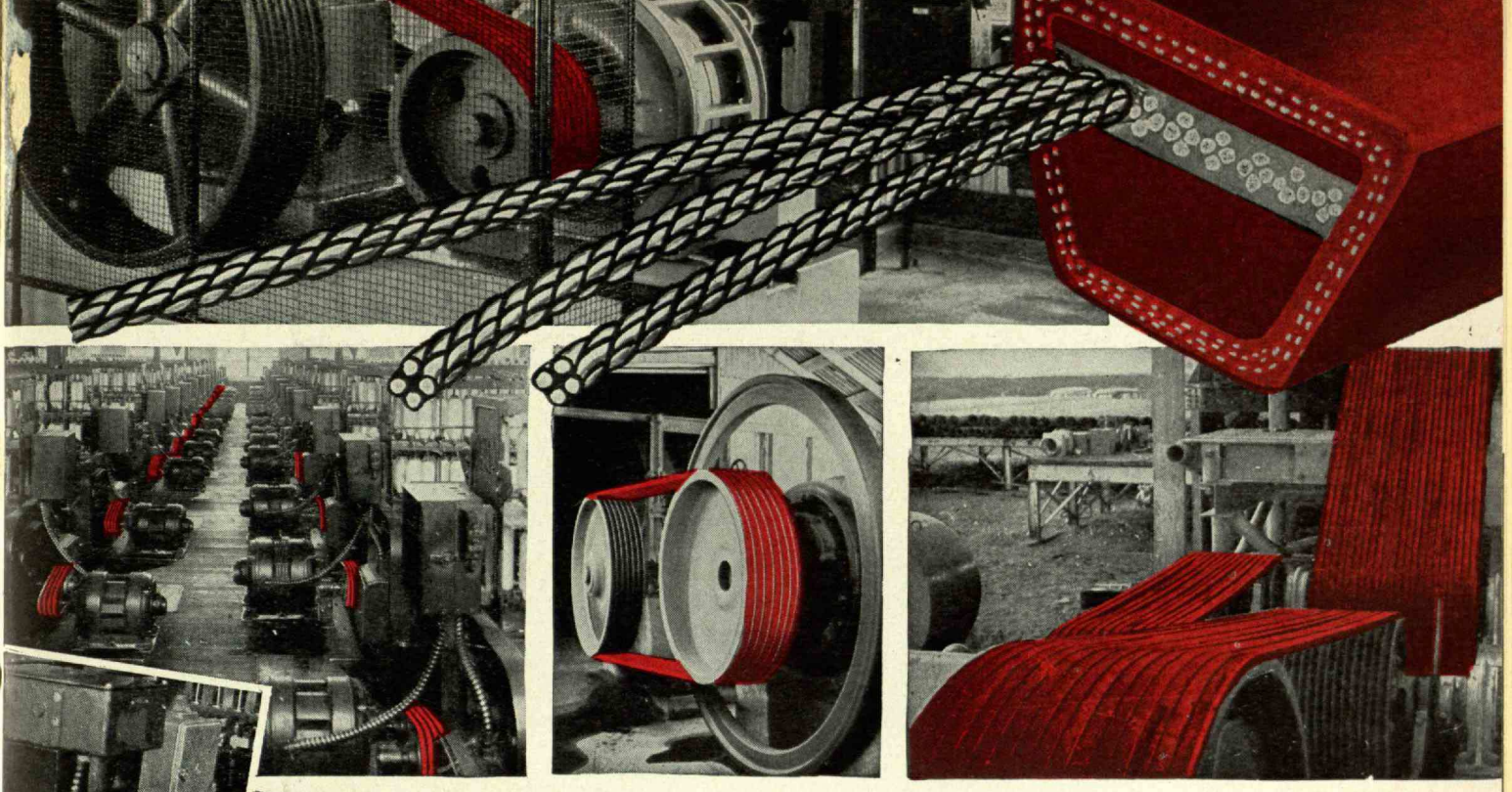
Robert J. Estes is said to be working in Hampton, Va. Seth E. Bransby came back from Europe with a French bride, who from all reports is very good-looking. He plans to go back to France after he gets his degree and work in that country. A letter from Max Daggett informs me that he is working for McDonnell Aircraft in Missouri. He is endeavoring to start up a private air field of his own on the side. A. Robert Almeida is working for the A. D. Little Company in Boston. He was married last June. Robert Benedict is now working for the Moore-McCormack Lines in New York. He is married to Dotty Burdick. William Boschen is reported to have graduated last September and is now working in Maplewood, N.J. Frederick Cavanaugh is going to become a big business man and now is attending that school up the river in its graduate business course. All I can find on Gerald Dennehy is that he is married and working in New York.

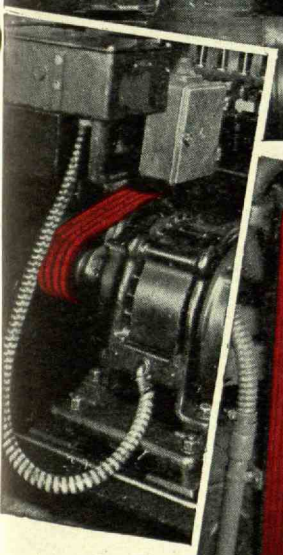
John Egbert is working here at the Institute, I have been told. Paul Heilman is at General Electric in Schenectady, taking a testing course. Robert Jevon is at Grumman Aircraft in Bethpage, Long Island. James T. Lawson is working in New York for the International Business Machines Corporation. John Lehman was graduated last June and married Priscilla Winget of Minneapolis in August. He is contemplating starting a Canadian branch of Faucet Queen. Charles Lynch has been in quite a few activities since I saw him last September. At that time he was working in Boston and rooming with Mal McFaull. He got tired of that job and took off for Sun Valley, where he became a general handy man. This job lasted for three months, and he is now in Philadelphia going to a school of journalism.

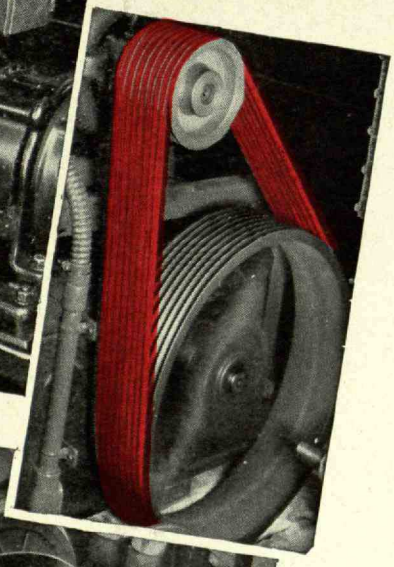
Robert Meny is now working somewhere in New England. He was graduated in September. De Ross Salisbury, who, you remember, married Dotty McKennon, also of our Class, is working for the Norton Company in Worcester, Mass. Ralph Seferian was seen in Boston by one of our colleagues, but I don't know whether he is working here or not. John Slifer is now graduated and working for the Shell Oil Company down at Wood River, Ill. William van Ravenswaay is reported to be in that great state of Texas. What he is doing with a General Delivery address at Phillips, Texas, I don't know. Maybe he has turned rancher.

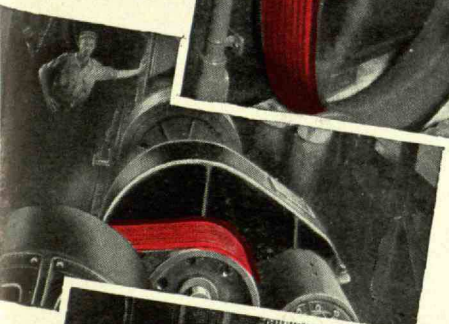
Dick Wareham has decided not to come back to Tech for his degree. He is now working for the United Shoe Machinery Corporation in Beverly, Mass., in their research department. During the war Dick had a serious hand injury which laid him up in the hospital for quite a while. Lorenzo A. Lamadrid is working for the American Cyanamid Company in New York City. Bob Metzger married Ruthe Craig on November 23. She is a Katharine Gibbs and Wellesley College graduate. Bob was released from the Naval Reserve with the rank of junior grade lieutenant after two and one-half years' service as intelligence officer, scout, and raider, in the Pacific. William Botten, De Ross Salisbury, and George Urquhart '42 were ushers at the wedding. Martin Hird married Sydelle Druckman of Riverdale, N.Y., on December 1. During the war M.C. attended the postgraduate school of the United States Naval Academy at Annapolis. Page Ufford of Middlebury, Vt., married Doris Carter of Boston. She is a graduate of Simmons College. Page was a former lieutenant in the Marine Corps and served in the South Pacific area. The couple plan to live in Niagara Falls, N.Y.

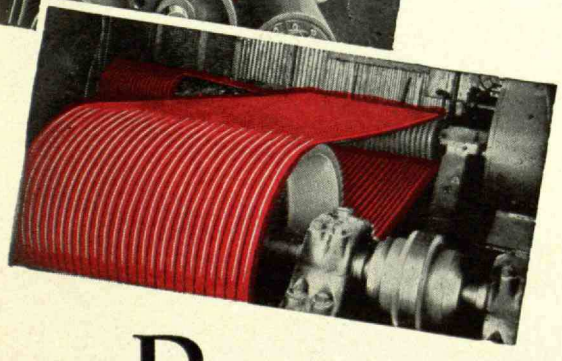
The following are changes of address received from the Alumni Office: Mario Banus, Chemistry Department, M.I.T.; Farlow Burt, South Bend, Ind.; Pei Chao, Chicago, Ill.; Conrad Chapman, Boston; Herbert Graetz, New York City; Lieutenant Edward Looker, Miami Air Depot, Miami, Fla.; James Macdonald, Cambridge; Pete Marenholtz, Washington, D.C.; William Sadler, Washington, D.C.; Edward Sanders, Barberton, Ohio; Joseph Schaefer, Detroit, Mich.; William Vaisman, Lima, Peru, South America; Robert VonBerg, School of Chemical Engineering, Ithaca, N.Y.; Dr. Milton Yusem, New York City; Arthur Zarlengo, Denver, Colo. — WILLIAM B. SCOTT, *General Secretary*, 6 Army War College, Washington, D.C.











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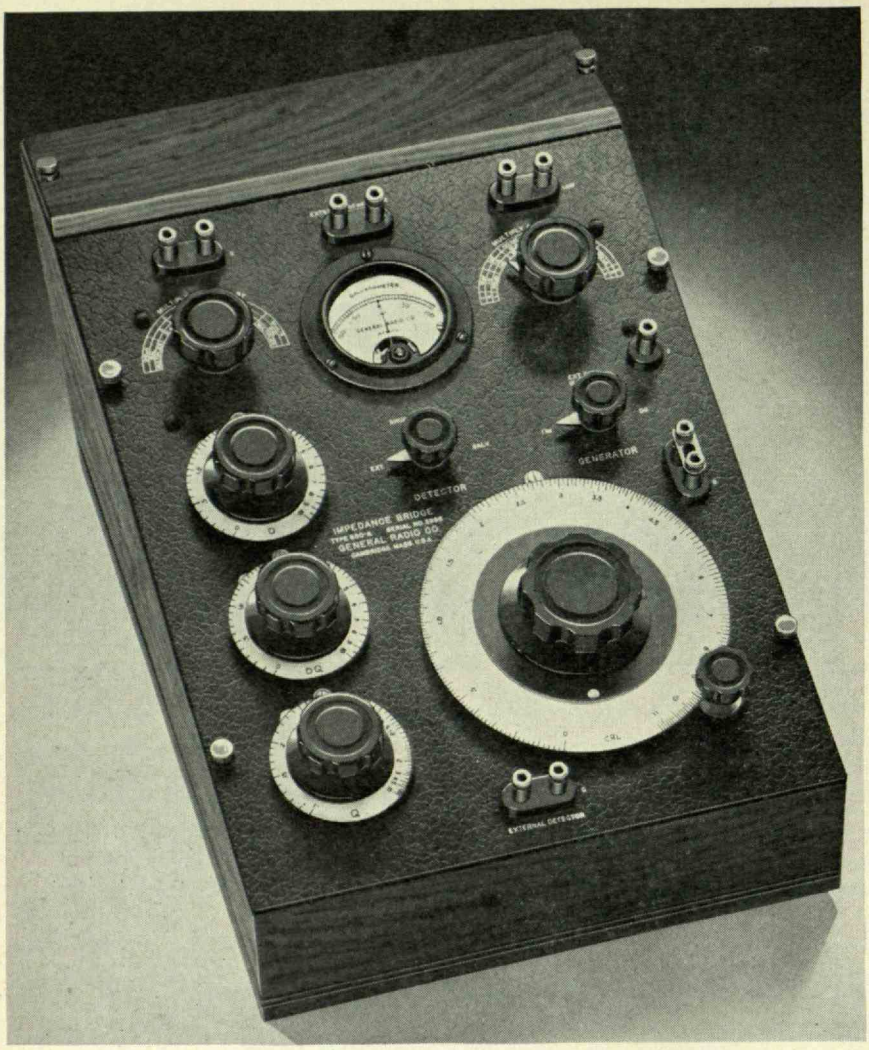
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